PEWTER DESIGN AND CONSTRUCTION

A Modern Pewterer at Work.
(Cooperation, Antiques Publishing Co.)

PEWTER DESIGN AND CONSTRUCTION

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THE BRUCE PUBLISHING COMPANY
MILWAUKEE, WISCONSIN

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Printed in the United States of America

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Dedicated To My Students

PREFACE

The material for this volume is the direct result of twenty-three years of contact with art metal work, of constant effort to secure a metal for the larger base-metal problems sufficiently responsive to the varying design and constructive abilities of all types of students and craftsmen. This metal is pewter, with a background rich in historic ideals and picturesque workmen, and of an adaptability unequaled for modern base-metal art projects. Formerly, few people knew of its existence, but a renaissance for pewter is imminent, judging by the products appearing in shops of the country. With this wave of popularity of pewter in evidence, the publication of this book seems to be a timely coincidence. The following incident led to the publication of the volume.

A number of years ago, the author was requested to repair a badly damaged, ancient fraternity pewter tankard. After considerable experimental work, an industrial product termed Britannia was obtained and used in the repairs so satisfactorily, that no perceptible differences in coloration were to be detected. Britannia was found to be an excellent quality of pewter, closely resembling old Colonial standards.

The pleasure experienced in this adventure with pewter led the author to introduce the metal into his art metal classes. Five years of experience have amply proved the value of pewter as an artistic means of expression, opened the way to new problems and new methods of procedure, while information received from other sources has been equally enthusiastic in its praises.

As the proper technic developed, the results were incorporated in a series of articles on pewter construction, and published in the Industrial Arts Magazine in 1925. From this and other new material, Pewter Design and Construction was compiled as the first text to appear on the technic of pewter applied to modern art hand work.

In this book, three points have been stressed: (1) A brief survey of the historic side of pewter, and a constant reiteration throughout the book of the spirit controlling the work and fine ideals of the ancient Guild of the Pewterers; (2) a new, simple and what the author believes to be a logical approach to designing appropriate to base-metals and detailed in

Chapter III, with special design comments pertaining to each problem; (3) a sequential series of problems arranged in their proper technical order, together with the tool processes for each. These projects are designed primarily as home utensils and furnishings; in other words, articles which possess both utility and beauty, and are capable of constant use in everyday activities.

These three aims allocate Pewter Design and Construction as an advanced text and reference work for secondary schools, normal schools, colleges, teachers, and craftsmen. Elementary processes are not detailed at length, but the worker, with some knowledge of the simpler tool processes, will have no difficulty with the problems. The equipment described is inexpensive; much of it may be made either in the home or school.

The author hopes that the intimate part played by pewter in past history, its close association with both king and peasant, with the lives of our Colonial ancestors, cannot but have an inspirational effect upon the craftsman, while modern problems in the closing chapters will benefit by this spirit.

On the subject of pewter, there are a number of books, published mainly for the collector. Pewter Design and Construction is unique in that it links and orientates the best design with construction. These dual influences will increase the student's background of ideals and information, emphasize the beauty and service inherent in true art metal products, while the attractiveness of pewter with its play of light and shadow, and coloring will supply the necessary outlet for his creative efforts, and give new life to the art metal course.

WILLIAM H. VARNUM

Madison, Wisconsin
May 27, 1926

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Pewter Design and Construction

Chapter I

HISTORICAL REVIEW

TO the teacher and student of the art crafts, ancient tools and materials supply a field rich in traditions and associations of infinite value, and of processes readily assimilated with modern school activities. For some time, the author has been testing the possibilities of a material scarcely known to the average individual, but of great importance to the craftsmen of the Middle Ages, a metal admirably adapted to the abilities of the elementary or secondary school pupil, or to craftsmen of professional standing, an alloy which makes possible a large range of practical and attractive articles. This metal is Pewter, with past traditions and practices of the best craftsmanship to its credit.

Before considering the technic of its uses, a brief review of past history throws light on many curious customs of interest. It is around the manufacture of pewter utensils that we find associated some of the famous crafts guilds of the Middle Ages.

The use of pewter goes back to the time of the Romans. Supplanting wooden ware, it was used extensively for such household utensils as spoons, plates, containers, salt cellars, and trays, particularly in countries and epochs marked by scarcity of wood or pottery.

In the Middle Ages, itinerant pewterers were accustomed to go from town to town, repairing or recasting damaged wares. At this period, common pewter was frequently composed of an alloy of 80 parts tin to 20 parts of lead. These traveling workmen frequently adulterated pewter with a larger lead content, producing a miserable "black pewter" which, early in the Fourteenth Century, caused an English Parliament to brand them as "deceivable hawkers," which was undoubtedly true.

RISE OF THE INDUSTRY

In England, during the reign of Edward III (A. D. 1348), the stationary or permanently located pewterers established a well-organized

guild or association with the aim, partly to prohibit dishonest products and partly to protect the industry by eliminating those outside of the guild. At this time, pewter was the material universally used by the middle and upper classes for the table and sideboard; silver plate appearing only on the tables of the highest nobles or in the royal palaces.

Illustration 1. A Pewter Tankard at the Metropolitan Museum, New York.

It is easy to realize that, with this lucrative field, the Guild of the Pewterers would naturally increase in strength and power. With this growth of power, we find the Pewterers' Company successfully petitioning for authority to supervise alloys, to destroy poor pewter or pewter products, to limit the manufacture of pewter to skilled workmen or their apprentices, and for the right of search throughout England for inferior material.

Let it be said, however, that any competent workman, regardless of the length of his apprenticeship, was admitted to the Company.

With the Pewterers' Guild of England in full and legal control of the material and the quality of product, the finest type of work was produced. Repeated offenses of bad craftsmanship, and the production of poor quality of alloy on the part of a member of the Company were punished by forfeiture of the wares, and denial of the privilege of manufacture. In addition to this, heavy fines were imposed. This meant the loss of membership in the Company, which deprived the workman of his livelihood, since by this loss he could neither sell nor be employed.

Illustration 2. Pewter Tea Urn of the Nineteenth Century, in the Metropolitan Museum, New York.

Another regulation of the Pewterers' Company forbade a master to employ a workman without a statement as to his character from his previous master, and (an interesting commentary on modern practice) under no circumstances could an employer coax a workman away from another master. To carry out the idea of brotherhood in the society, all disputes were to be settled within the guild, hence law-suits were unknown. Upon settling these disputes, the losing litigant was required to invite the winner and his wife to supper, and there to be merry together and so be friends henceforth. The Pewterers' Company Court held in London in 1559 decreed, "that Robert West should bring his wife upon Tuesday next to reconcile herself to Mr. Cacher and others of the Company, for her naughty misdemeanor of the tongue towards them."

DECLINE OF THE INDUSTRY

With power comes the desire for more power. So it was with the guild, and regulations were passed tightening the monopoly. Trade secrets were guarded so closely than no English pewterer could leave his country, no work was conducted in public, exportation of pewter was stopped, a monopoly of the tin mining trade was attempted, all spinning of metal was, as a mechanical product, prohibited, and the right of search was pushed with vigor. Many violations of trade standards were met by confiscation of the wares, and heavy fines were imposed upon the workers.

Illustration 3. Colonial Pewter Pitchers.
(Courtesy of the Wisconsin Historical Museum, Madison.)

But inventions and human discord checked this tight monopoly, which was, in a way unfortunate, in that the combine stood for the best ideals in workmanship and materials. With the introduction of cheap earthenware and china for table and domestic uses, the products of the pewterers were ousted. With civil wars sweeping the country, the quality of the material experienced a decadence, and the valuable right of search was necessarily abandoned. And lastly, with the discovery in the middle of the Eighteenth Century that an excellent alloy of pewter, called Britannia Metal, could be plated with silver, the forerunner of our modern plated ware, the remaining uses of pewter lapsed.

We have entered into the ideals of the Pewterers' Company with the intention of illustrating how the *workmen themselves* insisted upon the

maintenance of the best standards of design, high standards of workmanship, and high standards in the quality of metal. These ideals should control any attempt to revive successfully the original spirit in which the wares were produced.

MODERN PEWTER

Although many of the old formulae are lost to us, we know that some of them had a small lead content with a high percentage of tin, while others were completely free from all lead. In some ware a still higher percentage of tin was used, until in most respects it resembled closely the alloys of britannia given in Chapter II. We can regard britannia *as an excellent grade of pewter* and for modern uses superior to it, in that the absence of all lead allows the use of modern pewter with complete safety for foods of acid content.

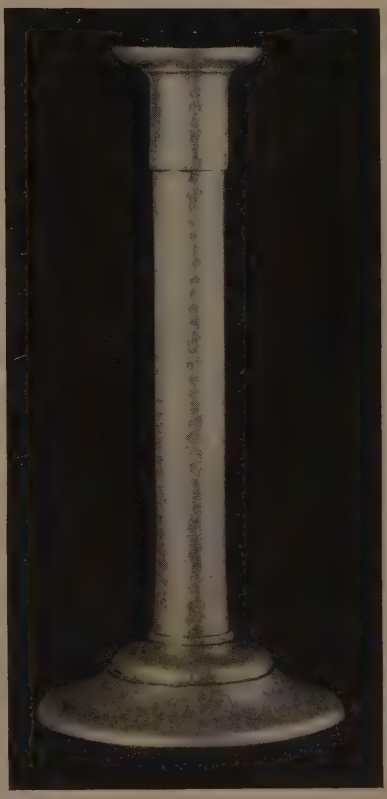


Illustration 4. Eight Piece Candlestick of Pewter Made by Students.

Britannia is considered a trade name for an alloy in the white metal group of modern industrial practice, and as such occupies a prominent place as a base in the manufacture of plated ware. As britannia is of comparatively recent development, it fails to have associated with it the fine traditions of pewter. Indeed, many britannia designs are too thin and ornate to be considered good design, hence it is to pewter we look for our ideals, holding britannia to be a trade name for excellent pewter. In this book the terms "pewter" and "britannia" are used synonymously.

For large projects in school crafts courses, copper, brass, and silver are now used. Many pupils are unable to carry these materials past the more elementary flat and shallow forms of construction, inasmuch as the boys and girls cannot give sufficient power to the hammer strokes, necessary to develop the more complex and interesting problems indicated by the illustrations in this book. This purely physical condition causes a struggle between the student and the material, in which the metal fails to be sufficiently respon-

sive to his demands. Under these conditions, enthusiasm wanes and the proper reaction to an art-metal course is lost. It is true that we have jewelry as an important outlet, but the argument for pewter is based on larger problems similar to house furnishings—electric fixtures, lamps, candlesticks, and challenge cups, trophies, trays, flower vases, and table ware, and for elementary grade work.

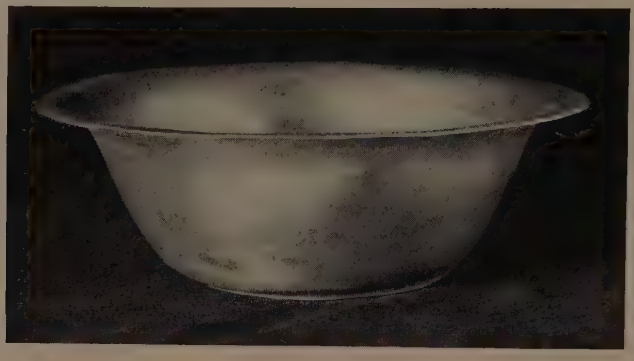


Illustration 5. Pewter Berry Bowl.

For these and similar projects, pewter is completely responsive as a highly ductile and malleable material. While spinning is the process followed in the industries of today, it was outlawed by the old pewterers. As it is wise to follow the old time methods, lathe work should be subordinated to the mediaeval processes of *beating* down, and *raising* and *casting*, although a certain amount of spinning and turning has its industrial and artistic significance.

Old formulae state the alloy of britannia metal to be 150 parts of tin, 10 of antimony, and 3 of copper. Modern alloys show 91 parts of tin, 7.5

Illustration 6. Pewter Sugar Bowls With Cast and Hollow Handles.

antimony, and 1.5 of copper. The color of the metal resembles silver. The slight patina, which forms on its surface after five or six months, may be removed readily, although in old pewter, it is regarded as a distinct, artistic attribute of value. The cost is not prohibitive, while the material may be obtained in sheets of practically any size and gauge. Illustrations 4, 5, and 6 were made by the author's students in the University of Wisconsin, while the other cuts in this chapter are museum specimens.

The malleability without annealing, the beauty of texture and color, the comparative freedom from oxidation, the ease of soldering, and the utilitarian value, not to overlook the excellent ideals which have governed its past production, make modern pewter a welcome addition to an art-metal course.

Chapter II

ALLOYS OF PEWTER, TOOLS, PROCESSES, AND PROJECTS

THE strong Pewterers' Guild of London, founded in 1348, counted in 1902 but two members, and its secret processes and the ancient Guild Hall have passed into history. But the cycles of history prove that traditions and customs revive. As an illustration of this, we have but to study the development of britannia. The firm of Reed and Barton, established in 1824, started the manufacture of britannia in Taunton, Massachusetts. The invention of electro-plating turned the style and popular taste toward plated ware, and the fine color of britannia became obscured by a coating of silver plate.

With the increasing prosperity of the country, the firm began to manufacture solid silverware. The recent increased cost of living naturally was reflected in the sales of the silver products of the company, and with the present period there came a demand for less expensive ware. As a result of this movement, we find the firm of Reed and Barton, after an existence of more than one hundred years, repeating the original patterns of the first venture in the original material — britannia.

Illustration 7. Modern Candle-sticks of Britannia.
(Courtesy of Reed & Barton.)

During the last century, sporadic attempts to revive pewter have led to failure, mainly because the simplicity and beauty inherent in the old designs have been disregarded. Over-decoration of the surface of a meat platter with a realistic human figure comes to mind as a typical example of one revival, a form of enrichment which

would have caused an unprecedented upheaval in the Pewterers' Guild. The creamer—Illustration 44—is an ornate example of this period.

Pewter is appearing in the sales rooms of the various craft societies of the country and art magazines are devoting considerable attention to the ancient products. The current attempt at revival seems genuine, inasmuch as the old ideals are evidently considered in modern designs. The time seems opportune for the introduction of pewter into art-metal classroom practice.

PROCESSES

Mediaeval technical methods of working pewter are essentially the same today. Casting, beating, an hammering or raising these metals represent typical modern classroom practice. Formerly pewter was cast in highly finished brass piece moulds put together with great accuracy. The Pewterers' Guilds owned large numbers of these moulds which were rented to the craftsmen for quantity production.

In the Renaissance, less expensive sand moulds were introduced for limited production, but the cost of removing the finely granulated surface from the ware added a large amount of labor to finishing the pieces.

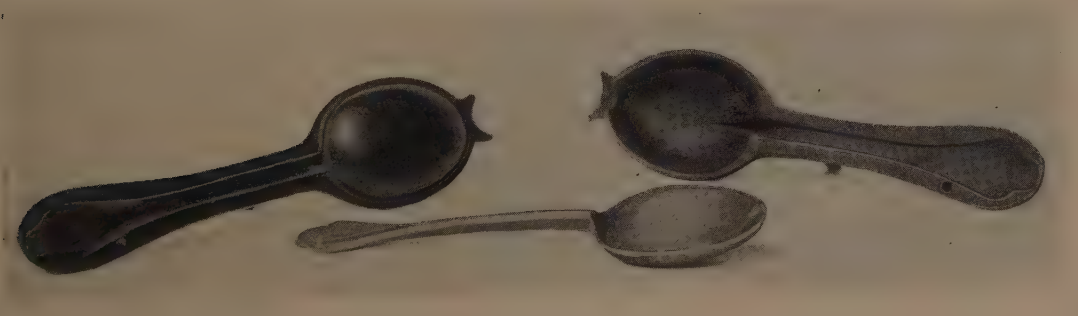


Illustration 8. A Colonial Brass Mould With Pewter Cast Spoon.
(Courtesy of the Wisconsin Historical Museum, Madison.)

Later methods show the use of iron and brass moulds, as represented by the two-part Colonial spoon mould of Illustration 8. For school use, moulds of plaster of Paris are entirely satisfactory for such appendages as handles, knobs, spouts, bases, paper weights, and other similar solid or semi-solid objects. Castings may be made of any thinness, and come from the moulds with a finish in direct proportion to the smoothness of the moulds.

Spinning pewter on a lathe is possibly the process most frequently used by the modern manufacturer of hollow ware, the products appearing

later on as silver plated ware for table use. In spinning, a block of wood is turned to the desired shape. A circular disc of metal is placed against this form by the use of a chuck, and all parts are again mounted on the lathe. By the use of a blunt tool, the rotating metal is spun or wrapped around the turned form into the shape desired.

Other products raised by the use of wood or metal stakes and hammers possess more individuality and quality than are usually found in either the cast or spun forms of quantity production.

THE MATERIAL

Pewter may be purchased in sheets under its trade name of britannia.[1] Under 20 gauge, American Wire Standard, the sheets are rolled 18 inches wide; in thinner gauges one may obtain sheets 30 to 36 inches in width. There are three qualities of the metal: No. 1, No. 2, and Two-Ply. No. 1 is an alloy of 90.7 percent tin, 7.8 percent antimony, and 1.5 percent copper and is best for hammered projects with a minimum amount of raising. No. 2 has 92 percent tin, 5 percent antimony, and 3 percent copper, and is of a softer grade, which spins and hammers much more readily. Two-Ply is a lower priced alloy. The facing is of No. 1 metal with a backing of lead, tin, and antimony.

The absence of lead in grades one and two makes the metal non-toxic and thus superior to the ancient lead-alloyed pewter. Tin, the chief member of the alloy, has important qualities. Whiteness and freedom from oxidation lend to its decoration a softness and delicacy of treatment which have been overlooked, mainly because of its industrial uses and of its associations with kitchen utensils.

Pewter may be soldered by using strips cut from the material itself, or by a solder composed of 50 percent tin and 50 percent lead, which is preferable for school use. The melting point of britannia is between 425° and 440° F., hence it will stand boiling water, but of course one should not place the ware on a stove or other hot surface without a thin sheet of asbestos under it.

THE TOOLS

The usual copper working equipment will do equally well for pewter but care should be taken to keep all stakes and hammers *free from scratches* and other marks: the softness of the material makes it suscep-

[1]The market price of No. 1 britannia averages from 57 to 62 cents a pound for 25 pound lots, with a material reduction for larger quantities. The Hoyt Metal Company, Boatman's Bank Building, St. Louis, Mo., by far the largest manufacturers of the metal, cut the sheets to order without additional expense. Reed and Barton of Taunton, Massachusetts, also supply britannia at reasonable rates. Silverware manufacturers retail britannia in 25 pound lots at approximately a dollar a pound.

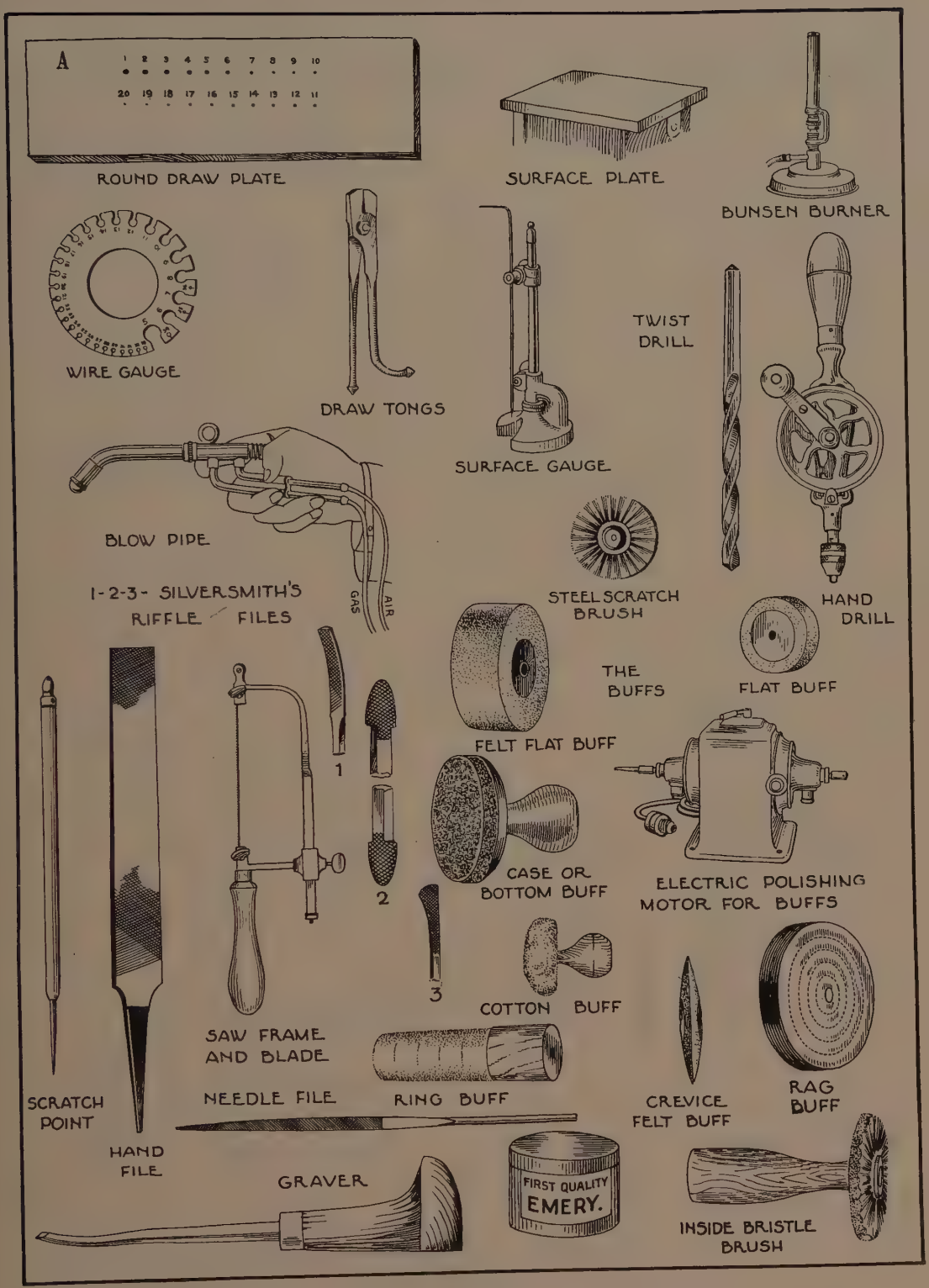
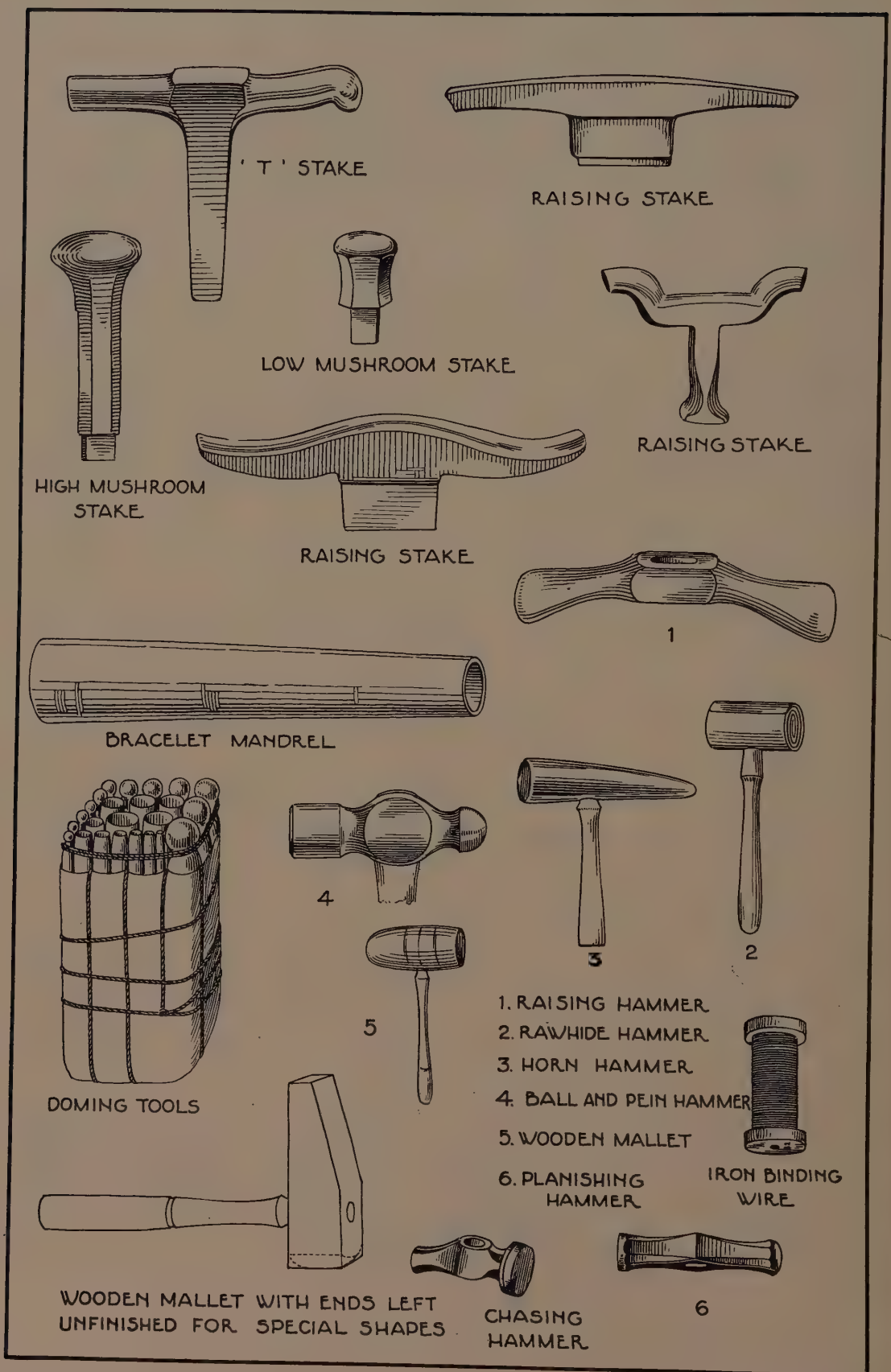


Plate 1. Equipment and Tools for Pewter Construction.


'T' STAKE
RAISING STAKE
LOW MUSHROOM STAKE
HIGH MUSHROOM STAKE
RAISING STAKE
RAISING STAKE
1
BRACELET MANDREL
4
3
2
5
DOMING TOOLS
1. RAISING HAMMER
2. RAWHIDE HAMMER
3. HORN HAMMER
4. BALL AND PEIN HAMMER
5. WOODEN MALLET
6. PLANISHING HAMMER
IRON BINDING WIRE
WOODEN MALLET WITH ENDS LEFT UNFINISHED FOR SPECIAL SHAPES
CHASING HAMMER
6

tible to marks upon forming surfaces. Wood stakes may replace most of the cast iron forms. Relatively coarse files should be used for rough filing, and

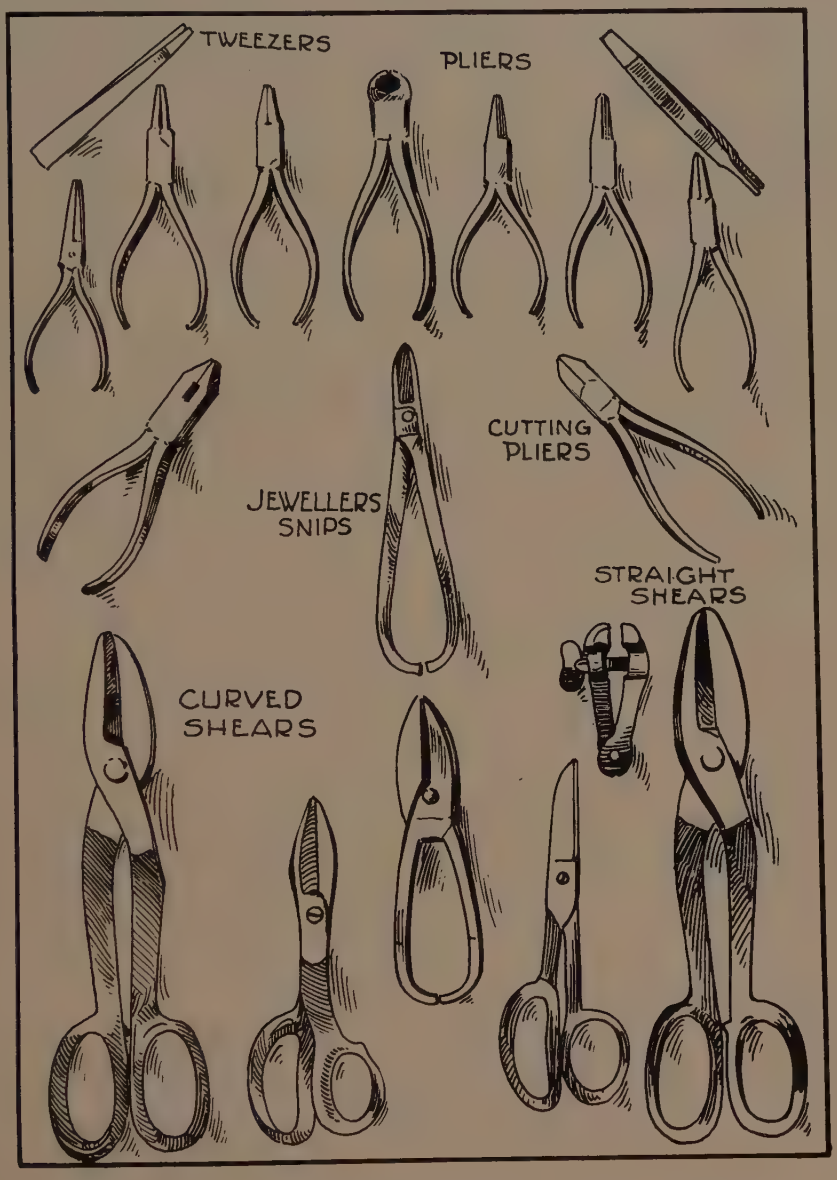


Plate 3. Pewter Tools: Flat, Round, Nose, and Side Cutting Pliers; Jeweller's and Tinsmith's Straight and Curved Snips and Shears.

single-cut smooth files for finishing cuts. Riffle or die workers' files are superior to needle files for small parts and corners. As the metal has a tendency to clog the files, one should be provided with file cleaners. Small

rawhide and wooden mallets, capable of being reshaped, are indispensable, while the horn hammer is useful.

A small gas-and-air blow-pipe, or even a mouth blow-pipe, may be used for heating. As suggested in Chapter I, the ease with which the material may be manipulated is one of its most valuable assets, but all pieces of equipment must be maintained in excellent working condition, or valuable time will be consumed in repairing damage caused by their defects. Plates 1, 2, and 3 are composed of cuts from well-known implement makers' catalogs, and will aid in identifying the various tools used in the forthcoming processes.

THE PROJECTS

The subdued lustre and the soft neutral tints of pewter harmonize with almost any scheme of decorative coloring. As a substitute for plated ware, pewter is a sincere and honest product, standing for just what it is, useful and attractive enough to justify its employment in the home. Old pewter was fashioned into such objects as plates, boxes for tobacco and snuff, hanging wash stands, beer mugs, and a great range of kitchen utensils. Some of these are no longer used, but many modifications will remain for modern applications. One may make spoons and ladles, jugs, flagons, cups, beakers and tankards, candlesticks, dishes, salt cellars, egg cups, measures, cream pitchers and sugar bowls, water jugs, coffee and chocolate sets, bowls, vases, mustard pots, salvers, plates, tobacco boxes, soup tureens, vegetable and salad containers, and trays for serving.

Modern home equipment suggests lighting fixtures, lamps, push plates, door knockers, cabinet fixtures, inlays for furniture, desk fittings, and possibly parts of "scout" equipment. Many of these problems may be simplified for elementary school children, and pewter will be found entirely within the muscular control of even fifth grade pupils. In Columbia University Practice School, the fifth grade children have been found to be most enthusiastic in their work.

This book is not an elementary treatise on metal work, and the author presupposes some knowledge of tools. It will be found preferable for beginners in pewter art to undertake simple beating-down projects such as small plates and trays, which are not unduly technical in construction, and which only require a short time for completion. Forms with hollow handles or spouts take much more skill and a longer time for finishing, and naturally these projects should be reserved for pupils who can concentrate for some time upon the work, without tiring. The satisfaction derived from completing ware of this type, compensates for the amount of time it

consumes. While duplicates are made in about one-half the time taken for the first attempt, duplication is unwise for educational and technical progression. However, sets may be completed in outside periods.

As pewter is a soft material, one must avoid an unfinished amateurish aspect in the ware by removing scratches, lumps of solder, and dents. Triangular scrapers, riffle files, chisels, engraving tools, and rounded sticks charged with fine emery or pumice aid in giving the desired perfection. For table ware, it seems advisable to use a dull or satin finish attained first by polishing the ware, and then by rubbing it with the finest of pumice stone and water. This finish is less likely to show finger marks.

The old pewter craftsmen did not look with favor upon soldering, but aimed to create their problems in one piece, soldering the parts together only when there was no other way out of it. The methods advocated in this book are a sort of compromise between the mediaeval methods and the modern school limitations.

Chapter III

PEWTER IN CONTOUR AND TEMPO

SINCE the ancient designer-craftsmen in pewter used great care in planning their designs, it is imperative that the modern student, dealing with an art metal of excellent traditional standards of beauty, should try to equal the best ideals. The study of old pewter and silver in these chapters, and visits to museums will supply many ideas, but as in all crafts, there are poor as well as excellent examples in museum collections and books of reference. Just how is one to separate the good from the bad or indifferent?

It is necessary to consider with care the metal and its characteristics. Compared with silver and gold, pewter is soft, but it is harder than lead. The enrichment of any soft metal preferably is confined to the contours, or so adapted to the object that continued use will not destroy its beauty. High surface enrichment and extensive carving on pewter in time would wear away and become unsightly or disappear.

Good proportioning and simply designed contours will last until the ware is discarded, thus making fine proportions and simple robust contours prime essentials. By robust contours is meant curves or straight lines which appear to give strength to the structure, as in Illustration 30, page 79. But in certain designs, robust curves and good proportions do not give beauty; the object seems to be clumsy and awkward. This factor introduces the need of the third element in britannia design—delicacy—which will save a soft metal from appearing thick and heavy. Small curves, mouldings, and other devices mentioned in other chapters, supply this fineness, but it should be kept in mind that a delicacy which interferes with utility is false enrichment. Britannia metal enrichment must be so planned as to avoid sharp contours and delicate curves on exposed surfaces subject to wear.

Contours must have character—distinguishing marks which are typical of the metal. Feeble, infirm curves must be supplanted by vigorous, robust lines which, by their almost physical strength, support the structure; wriggling or writhing contours of the earth-worm school, rhapsodies of the undisciplined hand, must be simplified into quiet unity, while clumsy proportions are to be refined to classic ideals.

While it is not the aim of this book to deal intensively with the subject of design, it seems worth while to devote the remainder of this chapter to the explanation of simple and new methods particularly applicable to the art of pewter. Of course, no method will guarantee perfect design, but certain suggestions make for a clearer pathway towards that end.

PRELIMINARY PLANNING

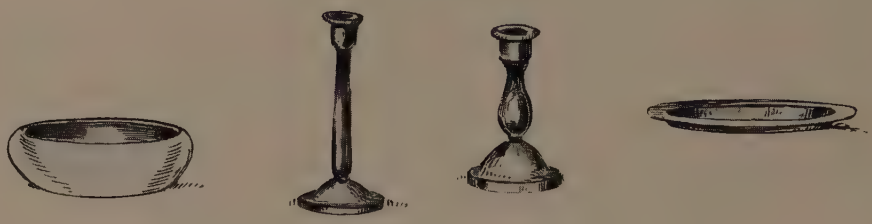
Step 1. Naturally, the first thing to do is to select a problem which is termed a *theme* or subject. From data secured from sources mentioned, make several sketches of the desired object, preferably in perspective, as in Figure 1, Plate 4. Select the best design, basing judgment upon (1) proportions, (2) structural relationship, (3) robustness, (4) delicacy, (5) unity and variety of contours, (6) unity of contours and appendages, (7) special data applicable to each problem, (8) service.

TYPES OF THEMES

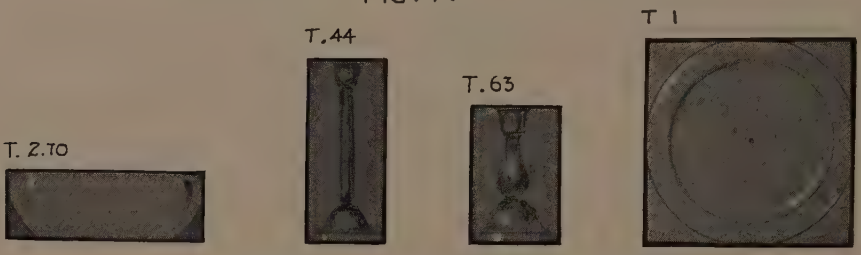
Step 2. Draw a full size rectangle enclosing the greatest height and width of the selected preliminary sketch, now to be considered as in orthographic projection. This rectangle should enclose the view which shows the most important contours, as in Figure 2, Plate 4. Bowls, candlesticks, pitchers, and similar forms show to advantage in side elevation. To show surface decorations of a round plate, a top view is used, but to design the basin contours, a side view is required.

In the study of the rectangular or other form of enclosure, called a primary mass, it may readily be analyzed as vertical, horizontal, or square in character, depending upon which dimension is longer, the width or the height. In the square, naturally these dimensions are equal. This mass analysis is important, as contours are *extremely sensitive* to slight changes of width and height. In Figure 2, Plate 4, there are two types of candlesticks, both designed within vertical masses. The right-hand pattern would not fit into the long vertical rectangle on its left. If we were to try it, the short full curves when stretched out would appear lumpy and unsatisfactory, whereas a long, slender shaft is pleasing. Certain types of contours seem predestined for their allotted enclosures.

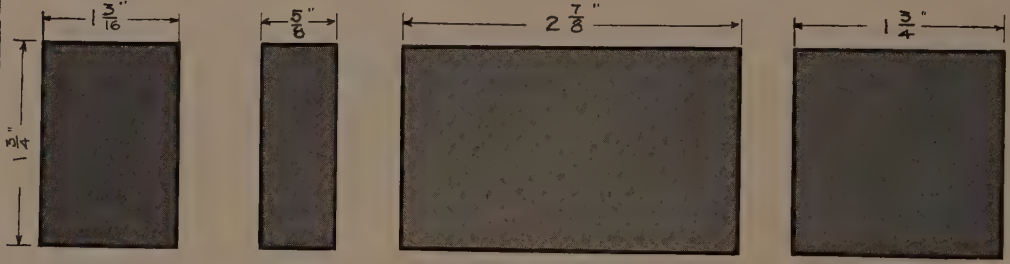
This contoural sensitiveness to slight changes of mass is due to what may be termed, for want of a better phrase, eye movement. If the short curves of the low candlestick of Figure 2, Plate 4, were to be extended vertically with their bulbous nature preserved, the eye in its attempts to grasp the design would become confused, and would register dissatisfac-



THE THEME OR SUBJECT TO BE CREATED
FIG. 1.

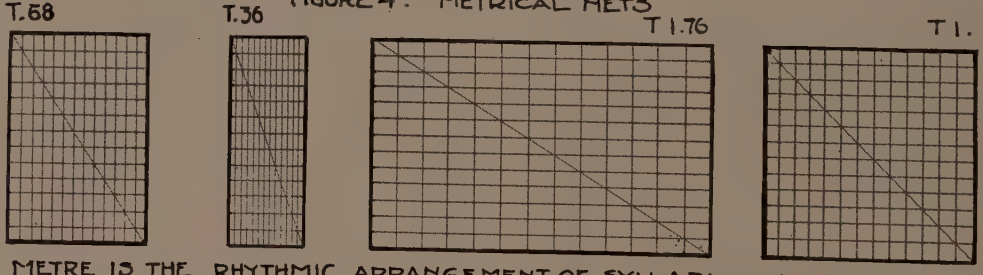


THE THEME ENCLOSED WITHIN ITS LOGICAL AND PLEASING VERTICAL HORIZONTAL OR SQUARE PRIMARY MASS
FIG. 2



ILLUSTRATING THE TEMPO OR DEGREE OF MOVEMENT (RHYTHM) FOR DIFFERENT THEMES
FIG. 3

FIGURE 4. METRICAL NETS



METRE IS THE RHYTHMIC ARRANGEMENT OF SYLLABLES IN VERSE. A METRICAL NET IS THE RHYTHMIC ARRANGEMENT OF HARMONIOUS AREAS WITHIN THE THEME EACH AREA IS EQUAL IN TEMPO TO THE MAIN THEME OR PRIMARY MASS.

Plate 4. Themes, Tempos, and Metrical Nets.

tion; but in the left-hand candlestick, the eye comprehends the design readily enough with pleasing results. The same aspects are true with regard to horizontal masses. A design can be made so long that the eye refuses to take it all in with any degree of satisfaction.

TEMPO

Step 3. Cannot then the amount of eye movement in a given vertical or horizontal mass be determined, thus making our design details fit the eye movement for that particular mass? This can be done, and the result is called the *tempo*, or the *degree of movement in a given mass.* In music, tempo is the time, or degree of movement in a composition. As music has borrowed many terms from art, it seems fair to use tempo as designating *the sense of movement generated by the character of the primary mass of the design.*

Arithmetically, the tempo of any primary mass, or other rectangle, is found by dividing the height into the width, the quotient or ratio being the degree of movement for the design. If the mass is square, the tempo is 1 and there is no eye movement, the area being termed static or lifeless, as in Figure 3, Plate 4. Look at this mass. The eye moves neither up nor down, nor to the right nor left. All vertical masses have arithmetical tempos of less than 1. The left-hand illustration of Figure 3, Plate 4, measures one and three-fourths inches by one and three-sixteenths inches. Divide the height in sixteenths of inches as 28 by the width in similar divisions, and the tempo is .68, giving a rather broad vertical form with a pleasing upward eye movement. The next form of Figure 3, with its tempo of .36, has a livelier vertical movement. Thus, it is seen that the more slender a vertical mass becomes, the less is its arithmetical value.

On the contrary, horizontal masses increase their arithmetical value as they increase their length. In Figure 3, Plate 4, the third rectangle, a horizontal mass measuring two and seven-eighths inches by one and three-fourths inches, has a tempo of 1.76. It is unwise to exceed 2.76 in tempo unless utility demands greater length. It is an easy matter to construct a primary mass of given tempo. For example, determine the *height* of a given object, such as a water pitcher, ten inches high, multiply the height by the tempo as .68, and the product is 6.80 inches, or approximately six and thirteen-sixteenths inches. By using the metric system, fractions are eliminated, and figuring results becomes much easier.

By experiment, it has been ascertained that certain tempos are better than others. Mr. Jay Hambidge in his work on "Dynamic Symmetry"

originated the idea of letting the ratio or, as termed in this chapter, the tempo, represent the height and width relations of areas. Furthermore, he discovered the repeated use of certain ratios by Greek designers. The most popular ratio used with frequency by both Greeks and modern designers is 1.618 for a horizontal mass and .618 for a vertical mass. This is the tempo of the well known Golden Oblong. Other Greek tempos selected from many are 1.11 — 1.23 — 1.38 — 1.854 — 2.236 — 2.47 — for horizontal masses; and vertical themes, .894 — .76 — .69 — .55 — .447 — .382 — .309 — .22. Tempos between .95 and 1.05 are too lifeless for attractive eye movement or interest, and should be avoided, unless the object's use requires tempos within this range.

THE METRICAL NET

Step 4. The next process is refining and perfecting the curves and spacings of the preliminary perspective or orthographic sketch. For this purpose, it is necessary to prepare what is to be known as the designer's *metrical net.* In poetry, metre is a rhythmical arrangement of syllables in verse, while a *metrical arrangement pertains to the measurement of movement or rhythm.* If the primary mass or theme can be filled with small areas similar to each other and to the theme in tempo, there results a unified and rhythmic series of *measures of movement.* These may be considered scaffolding upon which to develop the theme of the design, drawing it into complete sympathy with the tempo of the mass, and the tempo will be repeated or echoed through many details of the design, which are unified by the movement common to the design as a whole.

Figure 4, Plate 4, illustrates a number of nets for different tempos. To form these nets, divide one vertical primary mass boundary into a number of equal divisions. For large pewter projects, one-fourth inch divisions are satisfactory ; for smaller problems, three-sixteenth inch are necessary. If the metric system has been used, division will be more simple. Draw one diagonal of the primary mass, and extend the division points by horizontal lines completely across the rectangle. At the points where the horizontal members of the net cut the diagonal, extend verticals, and the net is complete, being almost like syllable division in metre construction.

Each small rectangle partakes of the general movement of the theme; each contributes its quota to the movement of the mass, forming a perfectly articulated whole. Let the eye move over the various forms of Figure 4, Plate 4, and feel the movement inherent in each. T .68 is a slow vertical; T .36 is a quick lively vertical; T 1.76 is a restful quiet horizontal;

and T 1 is without movement or a square. To make the following step easier, it is best to ink in the net, and place over it a tough but transparent tracing paper through which the net may be seen.

DEVELOPMENT OF THE THEME

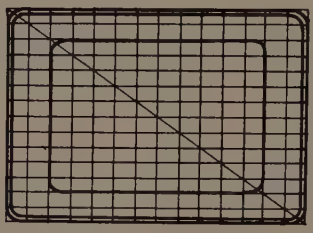
Step 5. If the net has so much of the character of the theme, developing the subject by using the meshes of the net as turning, beginning, and ending points for contours and spacings, is bound to impart to the design, a refinement and beauty in the spirit of the chosen tempo, repeating again and again the major theme as in music. Taking as an example the simple tray of Figure 1, Plate 5, notice the beaded or reeded rim. Usually the corners are quarter circles. By designing the corners within the boundaries of one space of the net, a curve is created which fits the character of the horizontal theme, and is more attractive in subtlety than the customary arc. Likewise, the rim of the tray varies in width at the sides and ends, sustaining the tempo of the theme and is proportionately related to the whole. There is a slight connection between the uses of the parts of the net for contoural curves and proportioning, and the architectural use of modules, both sanctioned by the architectonic or structural nature of the problems.

MOTIVES

Terminals and contour turning points of Figures 2 and 3, Plate 5, are clear—each with its element of robustness and of delicacy. At this time it is well to consider the emotional and aesthetic qualities of the lines composing the design, the *motives* of the tempo. A design composed mainly of straight lines is termed a *rectilineal* motive, and gives the feeling tone of honesty of construction, of permanence, and of solidity with strength. Figure 1 of Plate 5, expresses this feeling. Figure 2 is composed principally of curved lines and surfaces, and the motive is called *curvilineal*, with grace and lightness of construction, and accentuated motion. Figure 3, Plate 5, is a fusion of two motives, as both straight and curved lines appear in the design. This motive is known as the *eclectic*, and appears to give both sense of strength and grace of line.

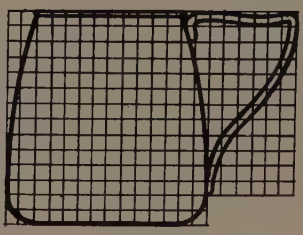
In Figures 1, 2, and 3, Plate 5, the main lines as well as the shorter or subordinate lines support the vertical or horizontal tempo of the theme. The more clearly to feel this influence of the net upon contours, study Figures 4, 5, and 6, Plate 5, and realize the peculiar sensitiveness of curves to changes of tempo. In these figures, we have a set of similar curves placed in nets of different tempos. The horizontal tempo of 1.61 tends to gener-

FIG. 1.



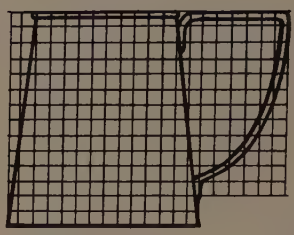
THEME- HORIZONTAL TRAY
TEMPO = 1.47
METRICAL MOTIVE MAINLY RECTILINEAL IN CONTOUR

FIG. 2.



THEME - CHILD'S VERTICAL MUG
TEMPO . 86
METRICAL MOTIVE - CURVILINEAL IN CONTOUR

FIG. 3.



THEME - CHILD'S VERTICAL MUG
TEMPO . 86
METRICAL MOTIVE - ECLECTIC IN CONTOUR

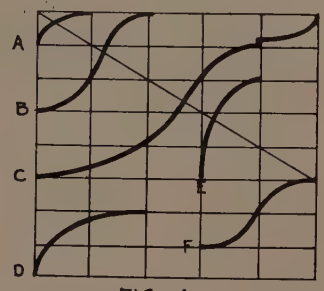


FIG. 4.
TEMPO 1.61

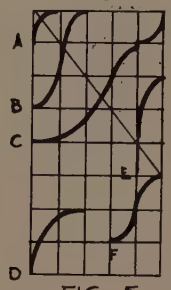


FIG. 5.
TEMPO .77

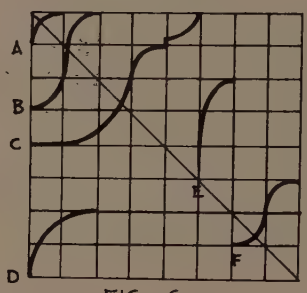
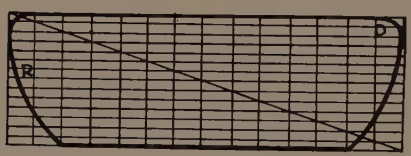
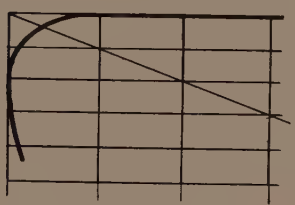


FIG. 6
TEMPO 1

CURVILINEAL DETAILS BASED ON METRICAL NETS OF DIFFERING TEMPOS

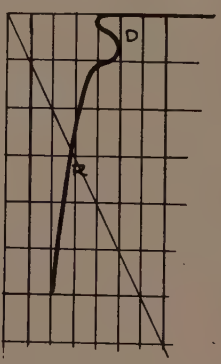


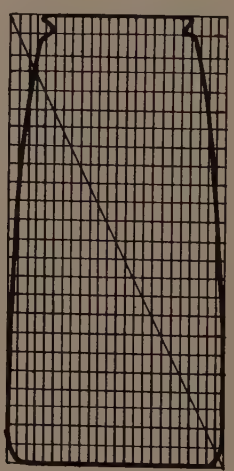
CURVILINEAL CONTOURS FOR HORIZONTAL THEME
TEMPO = 3
FIG. 7.



DETAILS OF FIGS. 7 - 8

ROBUST CURVES = R - R
DELICATE CURVES = D - D





CURVILINEAL CONTOURS FOR VERTICAL THEME
TEMPO .47
FIG. 8.

Plate 5. Themes, Tempos, and Motives.

ate curves of like spirit, while the vertical tempo of .77, Figure 5, Plate 5, gives the same types of curves an upward trend. The square net of Figure 6 encourages curves resembling grouped arcs of circles, mechanical in nature, and without the movement which is of charm and interest in contour design.

By this time, even the novice in design must begin to realize the aid supplied by the metrical net, enabling the designer to catch the spirit of his design and his tempo. Figure 7 of Plate 5 illustrates a low bowl with controlled beginning, terminating, and turning points for contours. Avoid monotony by beginning and terminating contours in different sections of the net, taking care to make bounding curves turn either decidedly above or below the middle mesh of the net. Figure 8, Plate 5, with its vertical .47 theme makes for an entirely different type of curvature, varying radically from the horizontal mass of Figure 7. Notice the quick lively vertical tempo of spirited design, and imagine the types of floral growth to which it is best adapted.

Plate 6 is designed to show further applications of the metrical net applied to britannia projects. It is not at all necessary to make curves in their transit pass through net intersections; it makes for better design, however, to begin, turn, and terminate them at *definite net crossings*. Let it be further understood that every detail need not fit into the net. Catch the spirit of the tempo, maintain the structural lines, avoid monotony, strive for simplicity and continuity of curvature, and use contrasts of direction with caution.

As the designer increases in skill, various rhythms will be discovered. Notice the measure intervals of Figure 3, Plate 6. The height is divided into measures of 1-2-3-14-2-4, showing freedom from monotonous repetitions. The large central area, space 14, gives the eye a moment of pleasing rest.

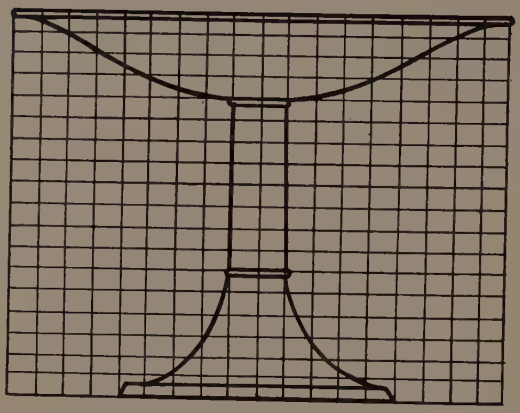
APPENDAGES

The appendages of Figures 2 and 3, Plate 5, and Figure 4, Plate 6, show them as designed upon continuations of the net of the primary mass. If the appendages are large, it is well to include them in the primary mass, as in Figures 1 and 2, Plate 6.

Plate 7 illustrates a variant of the preceding practice. The problem is to design a number of pieces of the same tempo—.90. The tea pot in the upper left-hand corner of the plate became the key note, with its primary mass 1-2-3-4 designed in accordance with that theme. The creamer

PROPERTY 10647 OF
COLBY SCHOOL FOR GIRLS

FIG. 1.

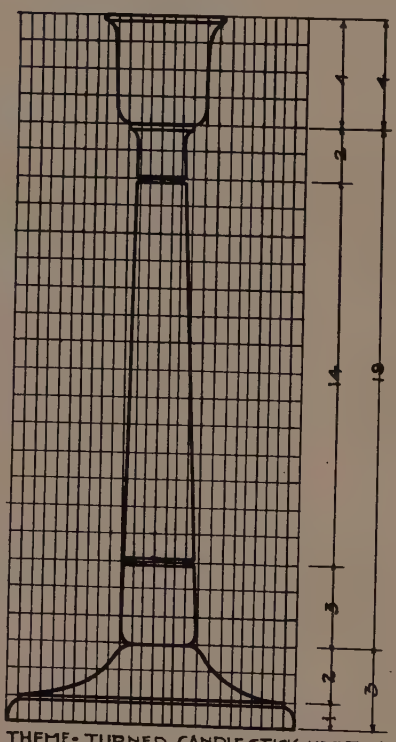


THEME • COMPOTE HORIZONTAL IN SPIRIT
MOTIVE • CURVILINEAL
TEMPO • 1.30

FIG 2.

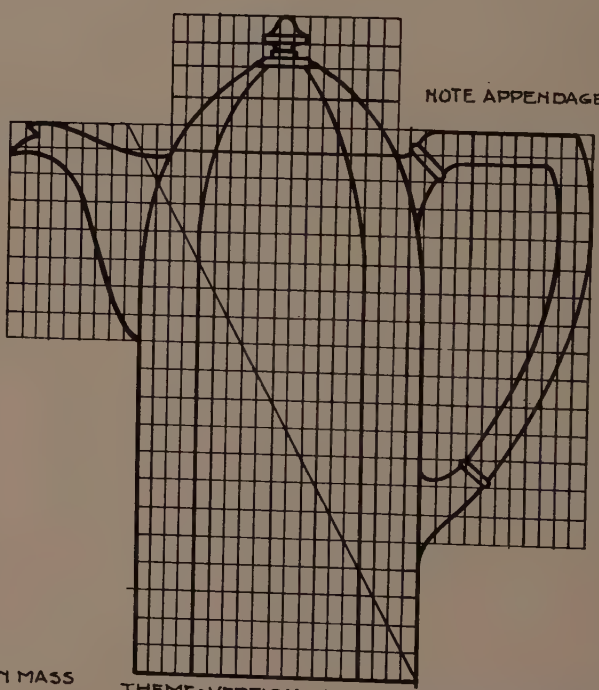
THEME • COMPOTE VERTICAL IN SPIRIT
MOTIVE • CURVILINEAL
TEMPO • .80

FIG. 3.



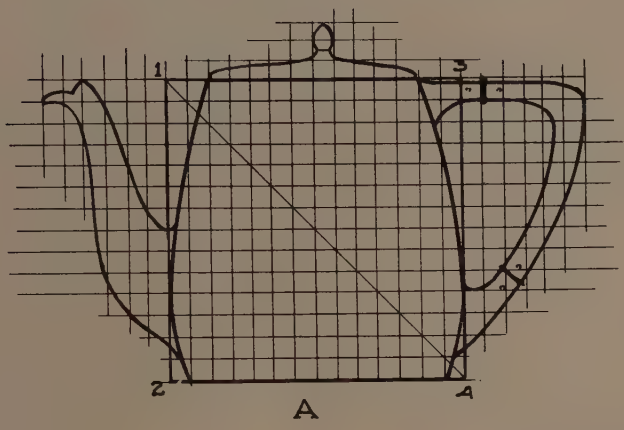
THEME • TURNED CANDLESTICK VERTICAL IN MASS
MOTIVE • CURVILINEAL • TEMPO .41
W.H.V. des.

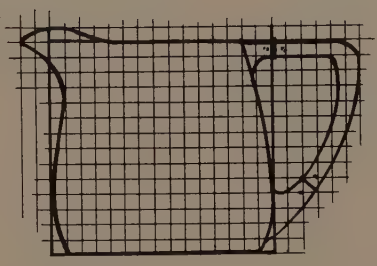
FIG. 4.



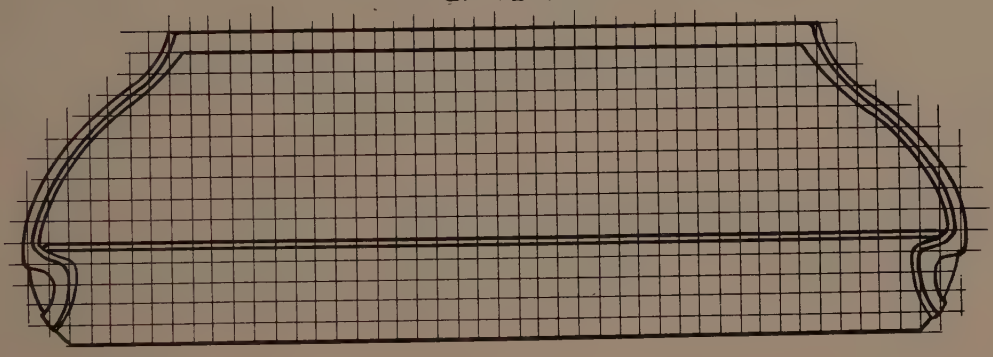
THEME • VERTICAL AFTER DINNER COFFEE POT
MOTIVE • ECLECTIC TEMPO .53

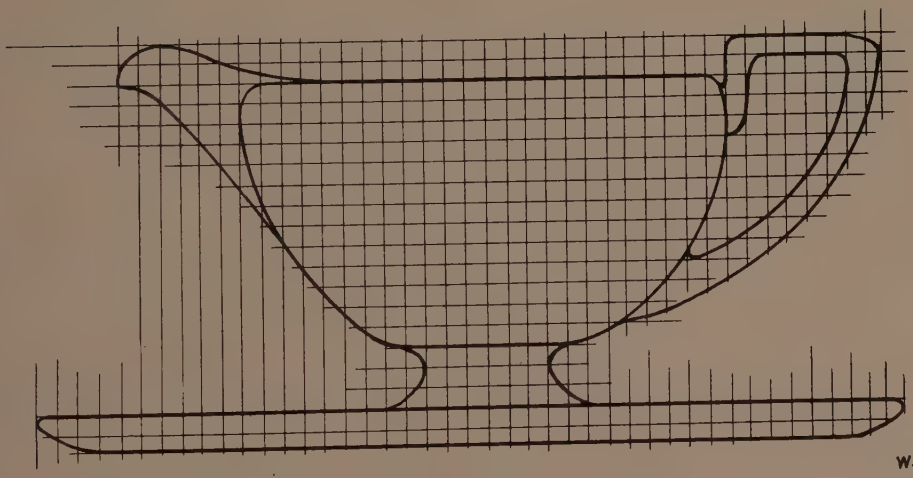
Plate 6. Themes and Their Appendages.





FOUR ARTICLES WITH TEMPOS KEYED TO THE PRIMARY MASS OF PROJECT "A". NOTE HARMONY AND UNITY OF FORM BY SIMILARITY OF TEMPO





W.H.V. des.

Plate 7. Use of Tempo .90 for Different Objects.

is of the same tempo, but reduced in size. The cake basket and gravy container are built up on a net of exactly the same tempo movement as is the tea pot, thus supplying a common measure for all articles included within the scheme. Use of the same metrical net makes the planning of similarly shaped handles a simple process, whether they are larger or smaller than the key design. Other details are readily harmonized, and the four articles have a sense of oneness and unity.

THE WORKING DRAWING

Other views necessary for complete working data are added to the principal view, care being taken to make such views multiples of the metrical net employed in the theme, thus bringing all views into a common unity. This chapter is but a brief treatment of a large subject; but with the aid of the suggestions of procedure, the general laws of design will be much more simple to follow to their applications in succeeding problems.

Chapter IV

ANCIENT PEWTERERS, BEATING DOWN, AND THE PLATES

CLASSIFICATION OF PEWTERERS

OLD-TIME pewter ware was grouped under two general heads—Sad Ware and Hollow Ware. Sad ware included the largest dishes and chargers (often used for boars' heads), platters, trenchers, and other articles which, due to their size, could not conveniently be cast in molds. These objects were fashioned entirely by hammering from the flat sheet. The process tended to compress the alloy, while adding to its rigidity, although over-hammering would produce brittleness.

The sad-ware men were poorly paid and regarded as inferiors by their fellow workers, possibly because they took the easiest way of finishing the beaten ware—lathe turning. The name, "sad ware," is supposedly a corruption or abbreviation of the type of metal used by their trade, "fine pewter"—*satiated* or *saturated* with as much copper as it would absorb. This gives an extremely ductile metal, quite fit for hammering.

The hollow-ware men dealt with smaller products cast in molds, such as mugs, pitchers, porringers, bowls, and tankards. They finished the ware with careful hammering, and a minimum of lathe work. As the molds were expensive, they were frequently borrowed or exchanged. Itinerant tinkers of our own Colonial period carried their molds with them, and cast the desired articles on the spot, melting wornout utensils into new ware. The spoon mold of Illustration 8, page 19, was used for this purpose. An ancient inventory of the year 1425 gives a good idea of what was cast and used at the time: "1 holow scharyder, 1 platmolde, 1 sawsyrmolde, 1 medyll (middle size) plat molde, 1 medyll dysche molde, 1 medyll sawsyr molde."

To guard against the making of articles under specified weight and therefore inferior, the products of the molds were carefully regulated by the Pewterers' Company. For example, chargers, platters, dishes, and saucers each had from four to six standard sizes, and each size was controlled by a fixed weight for every dozen. One dozen of the largest dishes must weigh eighteen pounds, while eleven pounds marked the requirements of one dozen small hollow dishes. A large charger must weigh seven pounds.

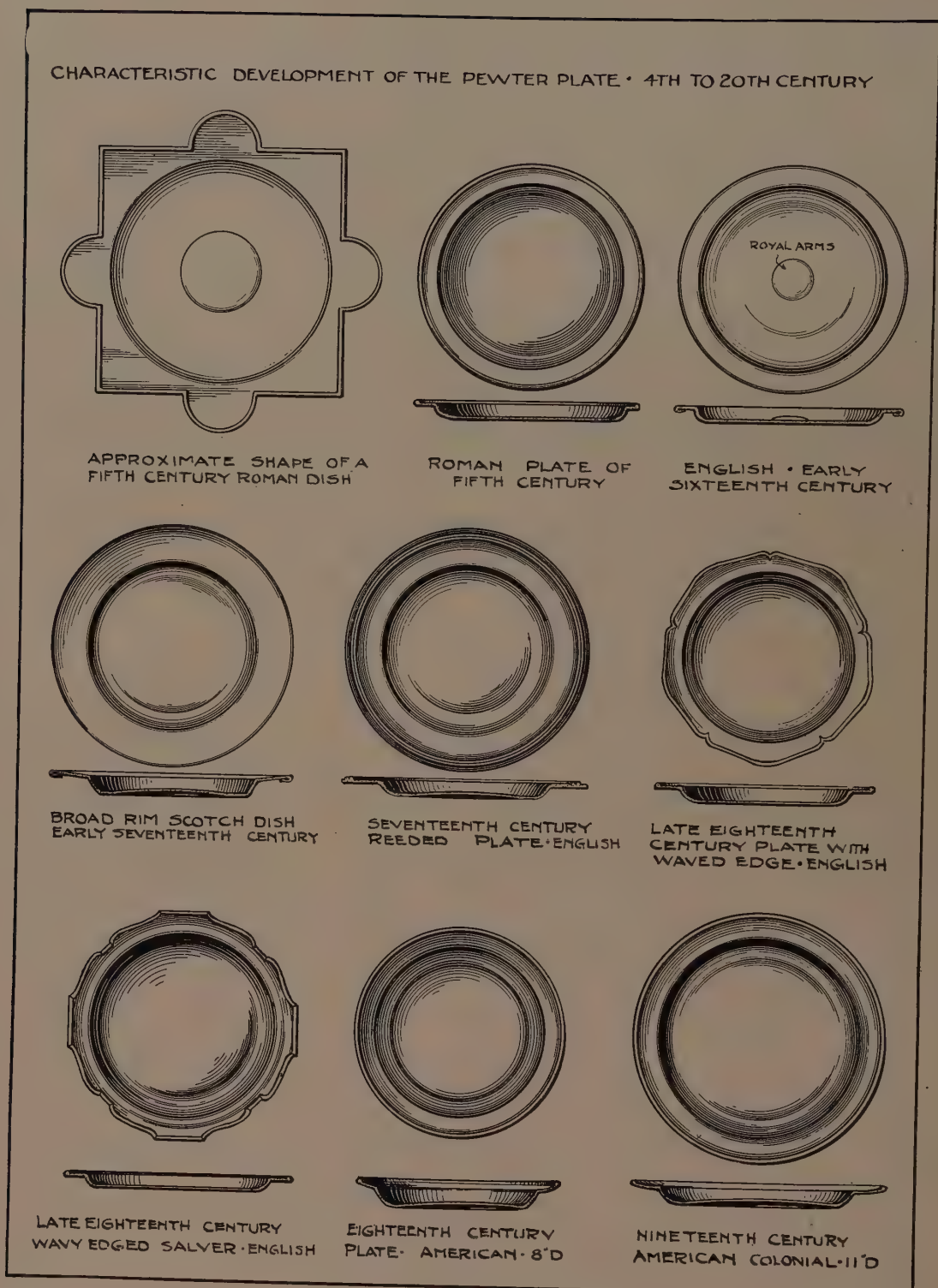

CHARACTERISTIC DEVELOPMENT OF THE PEWTER PLATE • 4TH TO 20TH CENTURY
ROYAL ARMS
APPROXIMATE SHAPE OF A FIFTH CENTURY ROMAN DISH
ROMAN PLATE OF FIFTH CENTURY
ENGLISH • EARLY SIXTEENTH CENTURY
BROAD RIM SCOTCH DISH EARLY SEVENTEENTH CENTURY
SEVENTEENTH CENTURY REEDED PLATE·ENGLISH
LATE EIGHTEENTH CENTURY PLATE WITH WAVED EDGE·ENGLISH
LATE EIGHTEENTH CENTURY WAVY EDGED SALVER·ENGLISH
EIGHTEENTH CENTURY PLATE· AMERICAN· 8"D
NINETEENTH CENTURY AMERICAN COLONIAL·11"D

Plate 8. Historical Development of the Pewter Dish.

If the design so allowed, hollow ware was cast in one piece; otherwise in a number of parts, soldered together and finished by being carefully turned, scraped, and finally burnished on a lathe with polished steel.

Small articles similar to salt cellars and spoons were made by the "triflers" who worked in an alloy of pewter, termed trifle. With this brief classification of the industry, the exact status of our problem, a shallow plate, is located.

Illustration 9. Late British and Colonial Nineteenth Century Cast Plates.
(Courtesy of the Wisconsin Historical Museum, Madison.)

THE PROBLEM—A DISH OR PLATE

Among the commonest objects of the pewterers' craft is the plate, Illustration 9, ranging in size from a few inches to twenty inches or more in diameter. In 1290 we find King Edward of England owning one hundred pewter dishes, one hundred platters, and curiously enough, one hundred salt cellars.

Early Roman plates on Plate 8, unearthed in England, show (with few exceptions) a marked similarity to modern designs. The earlier English plates were originally quite plain, strengthened by a single reinforcement placed below the rim. Later, this band was placed *above*, taking the form

of reeded bands, mouldings or flat beads, but many variations of this practice may be encountered. The Eighteenth Century rim is often enriched by mouldings in imitation of contemporary silver plates.

Illustration 10. An English Pewter Basin With Elaborate Carving and Punch Work.
(Courtesy of the Boston Museum of Fine Arts.)

In attempts to compete with silversmiths, the rim (a tempting area for the designer) frequently became the field for surface enrichment. Elaborate carving and punch work, which subtracted from the simplicity of good proportion, and attractive contours of well-designed pewter were introduced, as shown in Illustration 10.

THE DESIGN

As a rule, the older plates are much simpler than the modern productions, possessing broader rims and made of thicker metal. As our problem is an elementary one, we shall select one of the older patterns, remembering that old pewter was made by a master craftsman who evolved beautiful forms and proportions, not because of the value of the metal, but rather through a true love of attractiveness possible in an inexpensive medium through which he expressed his art. Moreover, the comparative cheapness of the alloy allowed him to develop a plate of sufficient size by which he could give free range to sturdier forms pertaining to pewter design.

The most important consideration of the designer is to determine (1) the proportional relationship between the width of the basin and the width

of the rim, and (2) the uniting line of curvature between rim and basin. Under point one, a study of the widths of rim and basin of the round Roman dish of Plate 8, compared with the broader rims of two Seventeenth Century plates, gives one the impression that the wider rim with its attractive expanse of metal adds effectiveness to the design, Illustration 11.

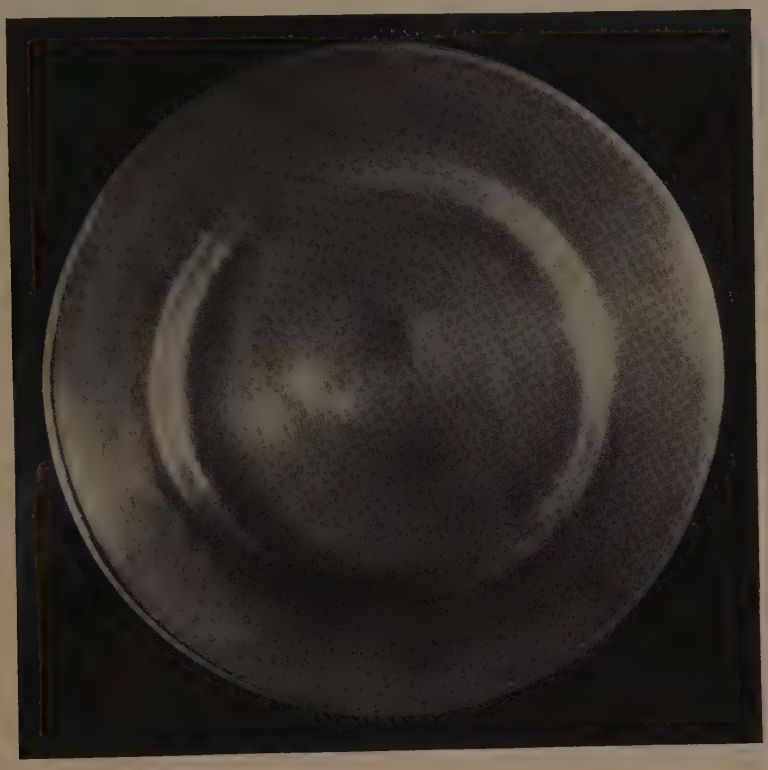


Illustration 11. Reeded Pewter Plate by Miss E. Edwards.

Under point two, there must be a transitional curve, equaling in purity the sweep of a Greek curve. A compass quarter circle is mechanical and ineffective. A sharp turn near the rim, developing into a flattened curve at the basin's bottom is better, approaching but not duplicating a quarter ellipse. The metrical net of Chapter III will aid in understanding this point. For constructive purposes, the bottom of the basin was and should be domed slightly upward.

Two American Colonial examples, illustrated in Plate 8 and Illustration 9, are proportionately deeper with concave rims. Here, one should follow the law of design, which states that the deeper the basin, the greater the angle of the rim; and conversely, the shallower the basin, the more

PROCESSES OF LAPPING, BEATING DOWN, PLANISHING, REEDING.
THE PROJECT: A LAPPED BRITANNIA PLATE FROM 6 TO 11 INCHES IN DIAMETER.

FIG. 2.

THE DESIGN, BASED ON A 17 CENT. PLATE, MAY BE VARIED BY REEDING, CHANGE OF SHAPE OR BY DOMING THE RIM.

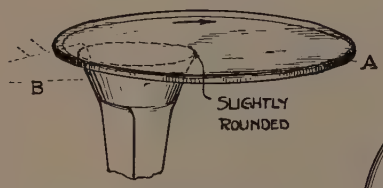


FIG 3. LAPPING. COMPLETE 'A' BEFORE STARTING 'B'

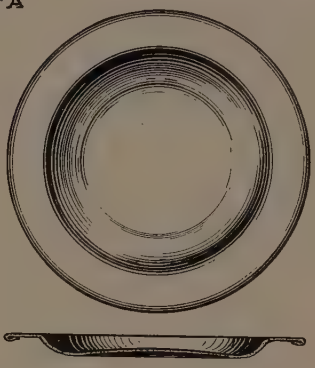


FIG. 1.

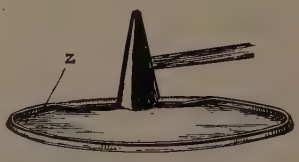
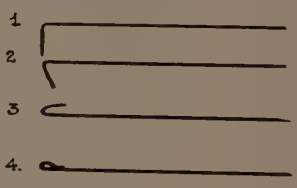


FIG 4. SEALING THE LAP.

FIG. 5: STEPS IN LAPPING.



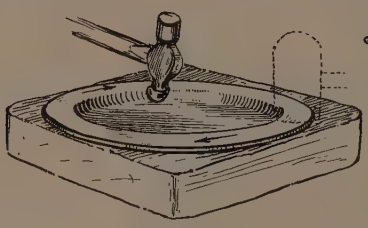
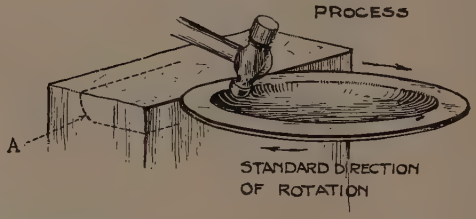


FIG. 6. BEATING DOWN

FIG. 7. ALTERNATE PROCESS



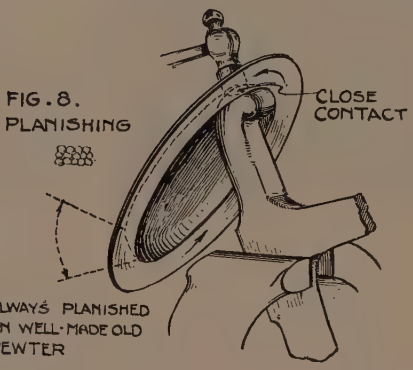


FIG. 8. PLANISHING

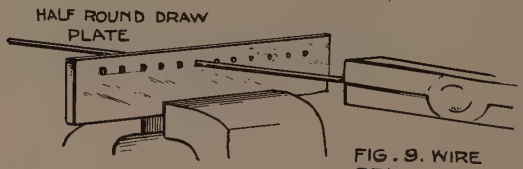


FIG. 9. WIRE DRAWING

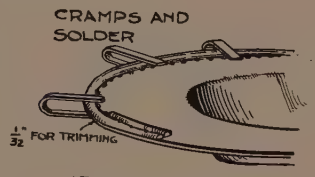


FIG. 10
METHOD OF HOLDING HALF-ROUND WIRE FOR REEDING.

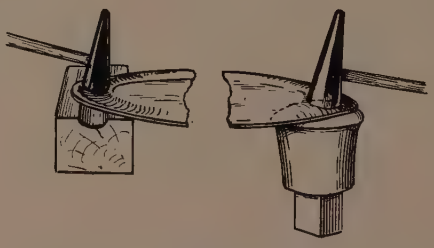


FIG 11. METHODS OF SHAPING RIMS OF COLONIAL PATTERNS

W.H.V.

Plate 9. Processes in Construction of a Dish.

nearly horizontal the rim. These variations are suggested for special uses, but a postulate in plate design is this: The more nearly the rim approaches a horizontal plane, the finer the result.

For accenting the contour of the rim, a tried principle of constructive design must be used, namely: Enrichment must support construction and be a part of it. Older plates (Plate 8) have their rims reinforced by flat bands of metal added to the under side. It is granted that this may be good construction; but by adding this reinforcement to the top side of the rim, not only is continued good construction provided, but at the same time an element of good decoration is added. Much strength is added to the plate by this reinforcement.

While our plate should have sturdiness, this top band gives an added delicacy quite fitted to the material. The illustrated reeded plate of English Seventeenth Century design, Plate 8, with its mouldings withdrawn slightly from the edge of the rim, does not prove as effective either for beauty or construction. Mouldings other than the flat bead or reeded pattern may be added so long as they are kept simple and of a restrained convexity, which will add to the appearance of the plate.

The Eighteenth Century wavy edged plates and salvers, Plate 8 and Illustration 10, with their mouldings well placed with relation to design principles, although they may be imitations of the silversmiths' art, are far from ornate and quite simple enough to be considered allowable in pewter. The illustration on Plate 8 shows the basin bottom as flat. The originals had small feet, reconciling flat bottoms to good construction.

Thus, it is seen that, while plates vary little in general form, they change to a marked extent in details as to rim and basins. The art of the designer is shown in these apparently trivial variations in which the imagination has opportunity to combine sturdiness with delicacy—the essence of plate design.

THE CONSTRUCTION—PLATE 9

After these design considerations, it may seem a bit anomalous to suggest a Seventeenth Century plate with reinforcement below the rim; nevertheless this lapped reinforcement presents the simplest form of plate construction (Plate 9), and as one gains in skill, reeded plates of better design may be attempted. The uses of this plate are so evident, that it is hardly necessary to summarize them.

Sad ware men were distinctly hammer men, and Plate 9 represents essentially hammer processes. Having completed the design with a plan and half-section drawing, cut a circular blank of 18-gauge No. 1 britan-

nia. An advanced craftsman developing a Colonial type, should use No. 2 metal. According to the size of the plate, which need not exceed twelve inches, add from one-quarter to three-eighths of an inch to the radius for lapping. With a pencil compass, draw a guide line for lapping, as shown in Figure 2, Plate 9, protecting the center of the plate from needle point marks.

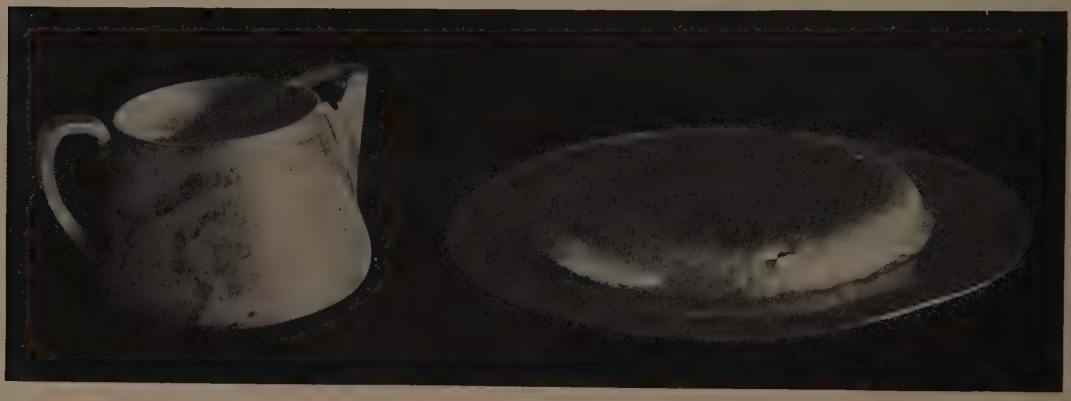


Illustration 12. Pitcher Overheated. Plate Cracked by Forcing Beating-Down Process.

A bottom-stake with its edge slightly rounded to prevent cutting the soft metal, or better, a cylindrical piece of smooth hardwood approaching the diameter of the pencil lapping guide circle, is fastened in a vise, and with either a wooden or horn mallet one may begin to shape the lap, as in Figure 3, Plate 9. Make this a gradual process, moving entirely around the metal blank on the pencil outline, with no attempt to complete the right angle (Step 1), Figure 5, Plate 9, at the first revolution. When Step 2, Figure 5, is secured, place the blank on a flat and perfectly smooth surface and close the lap by striking on the inside edge, leaving a roll to the outer edge as in Step 4, Figure 5. This roll adds to the apparent thickness, and strengthens the construction. A small nickel silver wire may be slipped into the lap at Step 3, Figure 5, and a perfect edge formed over this mandrel which is permitted to remain. This is one of the characteristics of Russian construction.

THE STROKE

At this stage, it is necessary to study the technic of the hammer stroke. Beginners have a tendency to hold the hammer stiffly, maintaining a rigid arm movement which is extremely tiring, and not conducive to the best results. Hold the hammer easily, swinging from the elbow and wrist with a flexible and free movement, and in such a position that a line

drawn from the center of the stake or form will always pass through the point of contact with the work, the hammer head and handle, the forearm, the elbow joint, and the shoulder.

Illustration 13. Plates Developed by Triple Hammer Strokes.

In lapping, the disc is held in the left hand which rotates the blank clockwise. The hammer man takes three strokes, feeding the blank slowly under the hammer; he pauses to shift the left hand to a better position; he repeats three strokes and again manipulates the left hand. The rhythm of the three strokes will become automatic, while the feeding process synchronizes perfectly with the strokes. Unless the hammer is in an incorrect position, do not shift it; *move the work under the hammer.* You are a power trip-hammer; let your muscles function in a like manner.

When the lapping is completed, draw a pencil guide line to mark the separation of rim and basin, and proceed to beat down into a turned hard maple block of the correct form, stretching the metal gradually downward directly over the curve, as shown in Figure 6, Plate 9. Three difficulties are encountered; the rim will wrinkle, the basin will become too large for the mould, or the basin will split open. (Illustration 12.) Check the first by the use of the flat end of the wooden mallet, and prevent the second by working slightly within the bending line, gradually moving out to the

limit of the mould. Forcing the beating-down process will result in splitting. Correct the third difficulty by bringing the edges together and soldering the cracked area.

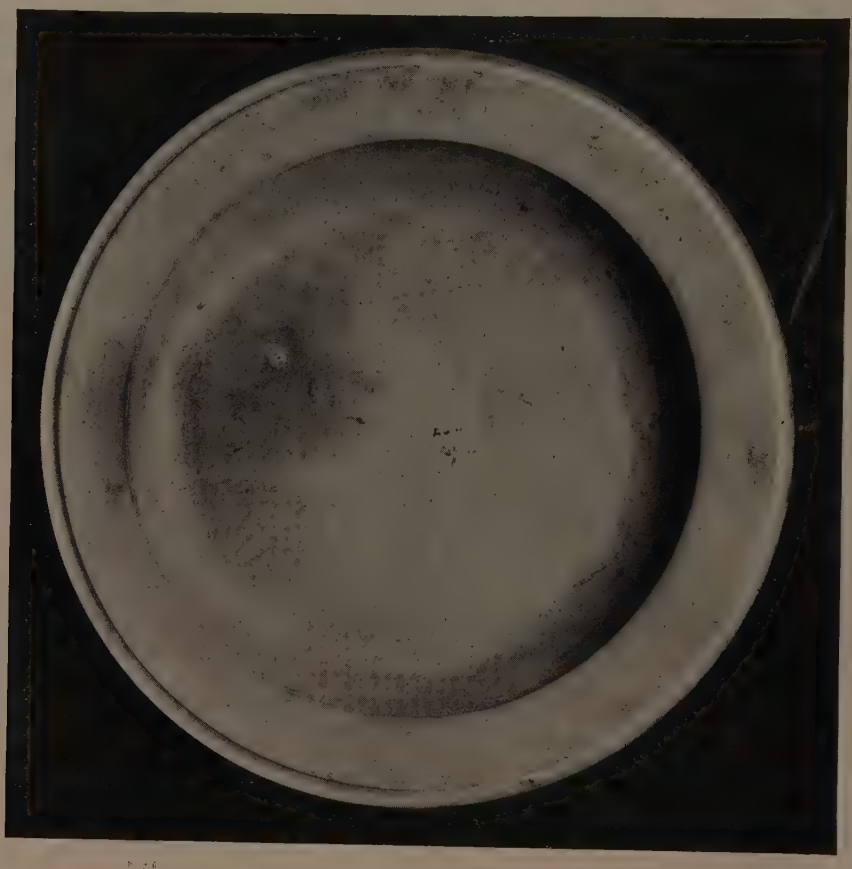


Illustration 14. An Example of Good Planishing.
(Courtesy of the Wisconsin Historical Museum, Madison.)

As alternate processes, Figure 7, Plate 9, considers beating down directly over the edge of a hard wood stake; while "A" (the second alternate) in the same figure illustrates a groove cut out of the top of the block. Imagine the blank shown to be moved back and across the block until the guide line meets the edge of the groove; the process then becomes a duplicate of Figure 7, Plate 9, while the guide for the rim-basin curve is controlled by the shape of the groove. The process of Figure 7 is to be carried out by the triple hammer strokes just described. In Figure 6, Plate 9, the form is rotated under the hammer; while, if difficulty is experienced in keeping the blank centered, small brads may be driven into the wood, forming guides within which the circular disc will rotate freely.

The alternate process gives greater freedom for invention, but it is more difficult to control the shape. The elliptical plates of Illustration 13 were developed by this method.

PLANISHING

In old pewter, the flat ware coming from either mold or hammer man was planished or hammered to refine and complete the desired curve between the *rim* and the *basin*. This hammering was desirable for increasing the durability and stiffness, because plates were subjected to great strain at that point. All good examples of old British plate show marks of the planishing hammer between the points indicated in Figure 8, Plate 9, and Illustration 14. One may fasten the tee, (Chapter II) or other stake approximating the desired curve, into a vise and, using the flat end of a ball pein hammer, or better still, the slightly curved surface of the highly polished silversmiths' planishing hammer, proceed to planish one row of strokes completely around the plate and directly under the rim. The stroke is scarcely more than a tap with the hammer, raised about four inches above the work, striking with the triple rhythm of the beating-down process.

As this is a perfecting and refining process, care should be taken to use a light springy stroke of even weight. Old-time apprentices were placed at the task of planishing large trays, work of extreme difficulty.

But to proceed with our planishing: When one row is complete with every part of the surface covered, follow with the second row, overlapping the first to a slight degree, and so on until the bottom of the curve is encountered. If the stake has a smooth surface, the inside of the plate will be well finished. Illustration 14 gives a clear picture of good planishing.

Dome the under side of the tray slightly upward in a manner similar to the porringer problem (Plate 13, Figure 8); remove all dents with the wooden or rawhide mallet, then polish with fine pumice powder and water, and the tray is complete. If desired, old-time processes could be followed, by shaping the plate from heavier gauged metal, beating down, chucking, thus finishing beads, rim, and lower part of the basin with turning tools and a lathe. Some teachers prefer to beat down plates with the rawhide hammer, thus avoiding all hammer marks and leaving the plate similar to the turned example of Illustration 9.

REEDING

After the student has become familiar with the process described above, attractive designs may be constructed by the use of the draw plate and draw tongs, Figure 9, Plate 9, and Plate 1, Chapter II. A strip of

No. 2 britannia of 16-gauge is cut from the sheet, pointed at one end, and drawn through the graded series of half round holes of the draw plate until the desired size is reached. The half round ribbon is then bent around the rim of the plate, and held in place by clamps of thin sheet iron or wire paper clips; *minute* pieces of solder (Chapter V) are placed at the joint and the enrichment is soldered. Too much heat will cause the cramps to sink into the reeding. Figure 10, Plate 9, depicts the plan, while Illustration 11 represents the completed plate by a student.

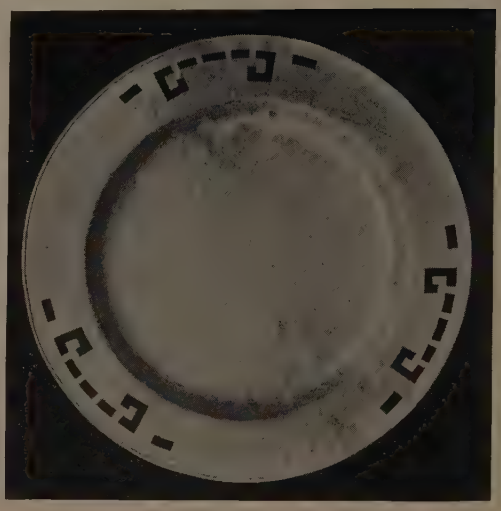


Illustration 15. A Pierced and Full Planished Pewter Plate.

A double row of reeding may be judiciously added to give delicacy to the design. If difficulty is experienced in holding the reeding in place, tack the moulding at one point with solder, and with this aid, shape and solder the remainder, using care to make correct junctions between the ends of the reeding as they meet.

Figure 11, Plate 9, explains school methods of shaping Colonial rims of the pattern illustrated in the design plate. A curved depression is beaten down into the rim, using a groove in a hard wood block and a rounding mallet. The rim is afterwards trued on a mushroom stake, the basin is beaten down as previously described, while the half round or ribbon moulding is added as the last step.

Illustration 15 shows the use of pierced work for plate decoration. If used with reserve, its effect is striking. An odd number of repeats as three or five is more pleasing than a static even number of motives.

In finishing, remove all lumps of solder with riffle files and polish carefully with fine emery cloth and oil, followed by finely powdered pumice and water. In applying these abrasives, use a rotary motion to blend the fine scratches into a desirable and serviceable finish.

*"Also, that no one of said craft, great or small, shall be so daring as to receive any workman of the craft * * * * if he be not a good workman and one who can have the testimony of his masters."—From Ordinances of the Pewterers, A. D. 1348.*

Chapter V

BENDING, SEAMING, SOLDERING, AND THE PITCHER

MANY teachers expect to find pewter much harder than it actually is. If this were so, there would arise the same difficulties which limit work in copper and brass. History has shown that pewter survives constant use through many generations. As britannia is really an excellent quality of pewter, stiffer and more durable in every way, there is no reason to suspect an early dissolution of the problems suggested in this book. Even copper, if dropped or hit, shows dents.

With the revival of Colonial and early English architecture, pewter ware has a complete historical and aesthetic accord; it is as appropriate as are copper and brass for use with Mission design. As one becomes more appreciative of the pure design and good proportion of pewter, the charm of the "bloom," a subtle light and shade, will become more apparent. There is no vivid glare in pewter; when polished to a high degree, its surface absorbs light in perfect balance.

THE PROBLEM

Plate 10 is intended as an introduction to the processes of bending, seaming, and soldering applied to a creamer with hollow handles. A full size working drawing should be designed in which it seems wiser to restrict the body contours to either cylindrical or conical shapes, severe in outline, represented in Illustration 16.

As there is a limited amount of bending in this first problem, No. 1 britannia of 18-gauge, is satisfactory. A small amount of lead-tin solder, which comes in wire form, is necessary. If the design is cylindrical, cut a rectangular blank with the tinners' snips, measuring in one direction the height of the body, plus one-eighth of an inch for trimming, and the diameter of the body times 3.14 for the remaining dimension. If the body is cone shaped, Step 1, Plate 10, shows the customary method of developing the pattern, adding one-eighth of an inch for trimming.

By the use of the hands and a flat wooden mallet, the body is shaped over a bracelet mandrel or the horn of a blacksmith's anvil. The edges are filed to a perfect butt joint, and the body is wired with medium iron binding wire, as shown in Step 2, Plate 10. Take particular care to note the method of wiring conical surfaces.

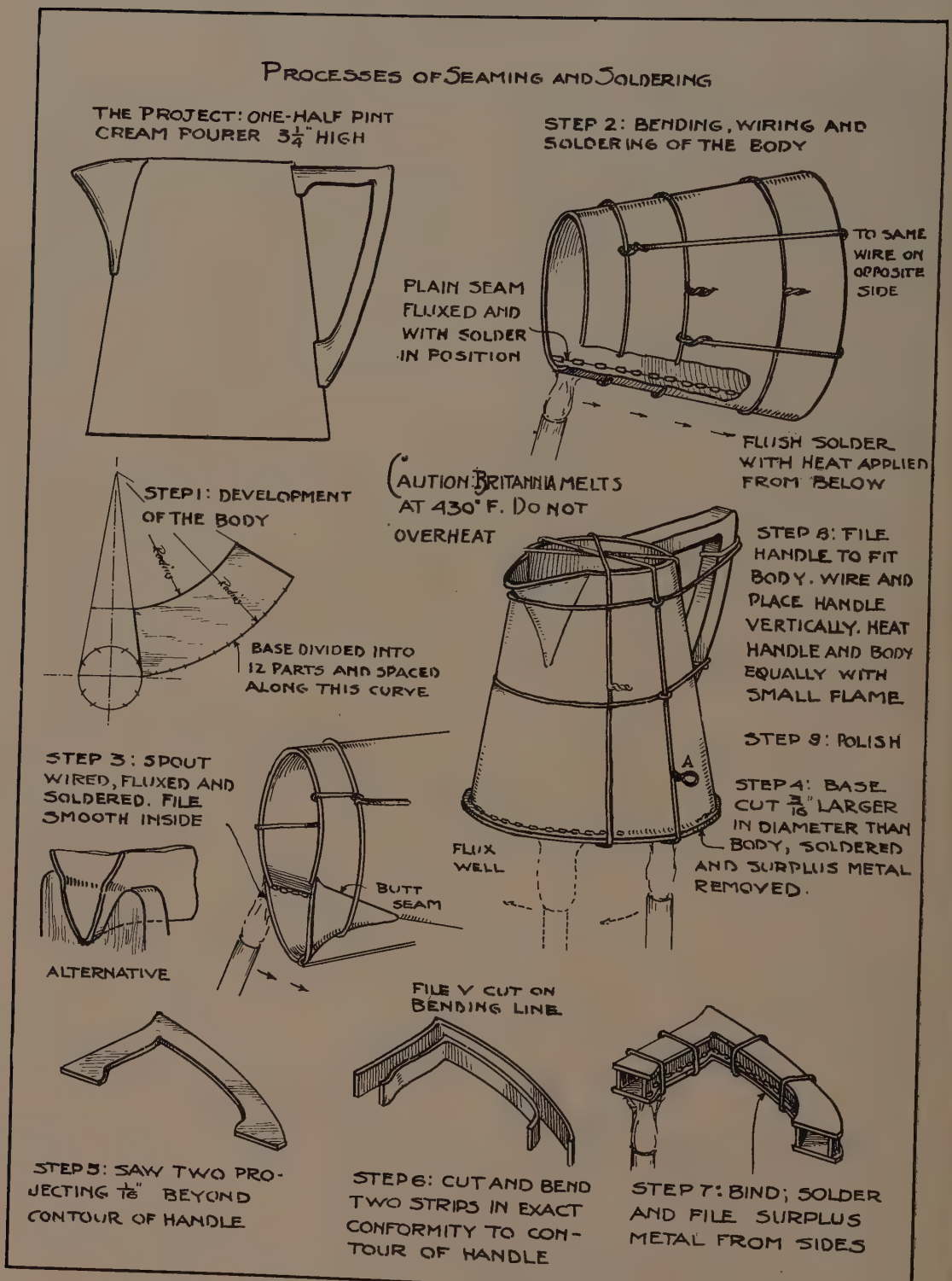

PROCESSES OF SEAMING AND SOLDERING
THE PROJECT: ONE-HALF PINT CREAM POURER 3¼" HIGH
STEP 2: BENDING, WIRING AND SOLDERING OF THE BODY
TO SAME WIRE ON OPPOSITE SIDE
PLAIN SEAM FLUXED AND WITH SOLDER IN POSITION
FLUSH SOLDER WITH HEAT APPLIED FROM BELOW
CAUTION: BRITANNIA MELTS AT 430° F. DO NOT OVERHEAT
STEP 1: DEVELOPMENT OF THE BODY
Radius
Radius
BASE DIVIDED INTO 12 PARTS AND SPACED ALONG THIS CURVE
STEP 8: FILE HANDLE TO FIT BODY. WIRE AND PLACE HANDLE VERTICALLY. HEAT HANDLE AND BODY EQUALLY WITH SMALL FLAME.
STEP 9: POLISH
STEP 3: SPOUT WIRED, FLUXED AND SOLDERED. FILE SMOOTH INSIDE
A
STEP 4: BASE CUT 3/16" LARGER IN DIAMETER THAN BODY, SOLDERED AND SURPLUS METAL REMOVED.
FLUX WELL
BUTT SEAM
ALTERNATIVE
FILE V CUT ON BENDING LINE
STEP 5: SAW TWO PROJECTING 1/16" BEYOND CONTOUR OF HANDLE
STEP 6: CUT AND BEND TWO STRIPS IN EXACT CONFORMITY TO CONTOUR OF HANDLE
STEP 7: BIND; SOLDER AND FILE SURPLUS METAL FROM SIDES

Plate 10. Introduction to Processes of Bending, Seaming, and Soldering.

Next, the wire solder, which should be about one-sixteenth inch in diameter, is cut into one-eighth inch snippets and placed approximately one-eighth inch apart along the seam, as indicated in Step 2, Plate 10. The flux for britannia preserves the surfaces from oxidation and is made by mixing one ounce of glycerine with five drops of hydrochloric acid. This mixture is applied freely to both sides of the seam and to the solder.

Soft soldering is simple and successful if the following rules are observed:

1. Flux should cover and permeate all parts of the seam and solder.
2. Absolute cleanliness is necessary. Both seam and solder should present bright, clean surfaces.

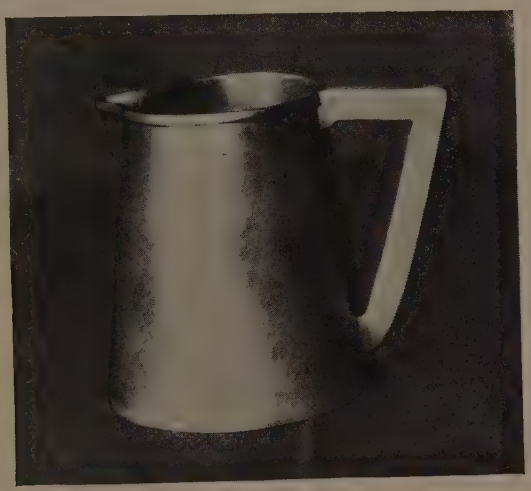


Illustration 16. Pewter Cream Pitcher With Light Hollow Handle.

3. Solder flows towards the hottest area. It is then obligatory to play the flame on the larger mass, letting the heat radiate and be transmitted to the smaller mass. This insures uniform heating, the most important essential to good soldering.
4. To avoid melting britannia, *use a small flame*, varying with the size of the article. The difference between the melting points of the metal and the solder is slight.
5. If light is seen through a joint, the chances are that capillary attraction which causes solder to enter joints, will not be strong enough to make the seam tight.

Apply these rules to Step 2, Plate 10. As both halves of the base are of equal area, the flame may be located directly *under* the seam, moving con-

tinuously from end to end until the solder is flushed. Note that as solder always flows toward heat, in order to draw the solder through the joint, the flame should be placed under it.

After soldering, true the body by placing it on the horn of an anvil or bracelet mandrel, and with a wooden or raw-hide mallet tap lightly into shape. The body is turned slowly clockwise on the mandrel, and the hammer should start at one end, while the body is rotated and fed slowly under its blows, thus making a continuous spiral of hammer strokes throughout the entire length of the body. By using a non-metal hammer, no strokes will show on the metal.

Illustration 17. Modern Adaptation of an Old Pitcher.
(Courtesy of Reed & Barton.)

Step 3, Plate 10, is concerned with the spout. Here the trial-and-error method may be used by cutting and bending a strip of paper into the proper shape for the spout. Upon a scrap of pewter, trace around this pattern, trim with the jeweler's snips, and fit carefully to the body of the creamer. Now saw out of the creamer a piece of metal *almost* as large as the desired cream outlet, and place on the ledge thus formed, the customary snippets of solder, as illustrated in the same Step 3. Play the *small* flame on the outside of the body and draw the solder through. Too much heat will melt the spout, as shown in Illustration 12, page 44. With half-

round hand files, remove the surplus material and solder from the inside. This may be accomplished readily since the bottom of the creamer has not

Illustration 18. Plain Edged Plate and Reeded Creamers.

Illustration 19. Initialed Plate, and Hollow-Handled Tankard.

been attached and the files have freer play than with the base attached. In Illustration 3, page 14, a small rim of metal has been left at the point of contact between spout and body.

As an alternative method, a strip of hard maple may be cut to the shape of the spout and the body metal driven into the depression by a process called "lipping." The advantage of this process lies in the fact that soldering is not necessary, and the body and spout are in one piece. For very small spouts this method is excellent; for large spouts the process is likely to get the body full of dents and out of shape.

Illustration 20. An Elliptical Pewter Tray with Sugar Bowl and Creamer. The Handles Show Faulty Workmanship.

Steps 5, 6, and 7, Plate 10, show the formation of the hollow handle. In place of cutting four strips and soldering them together as in Step 7, the two side strips of Step 6 may be placed directly upon a scrap of pewter and soldered. Then, with a jeweler's saw and a "0" saw blade, cut around the strips and file into shape. By repeating this process, the fourth side of the handle is secured to the parts already assembled.

Attach the handle to the body by placing the latter on its side with the spout down, locating the solder snips in such a position that they will not roll off. Two applications of heat may be necessary. In applying heat for soldering the handles, use care to heat the body of the creamer *around* the handles and let the heat radiate to the latter. Frequently it is well to leave the base to be attached as the last step, but the experienced craftsman can attach both handles and base in the same application of heat. Details of wiring are shown in Step 8, Plate 10. Note the twist in Wire A. This allows one to tighten the binding wires on both sides of the base.

Illustration 17 gives a modern adaptation of an old pitcher, with the spout slightly wider than is desirable. Illustration 18 represents pitchers

with reeded rims and variations in spout and handle design, while the hollow handle is, in Illustration 19, applied to a tankard.

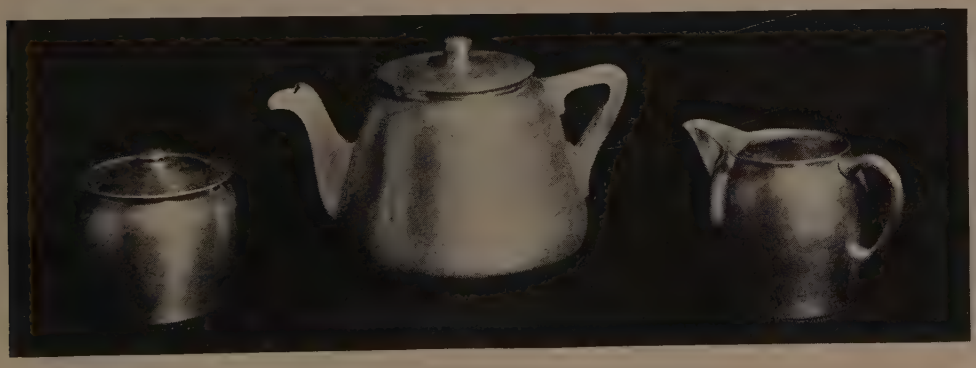
Illustration 20 presents a combination problem in which the elliptical tray has been planned to contain both creamer and sugar bowl. The errors indicated in the illustration are common to beginners, but with care all handles may be made similar.

FINISHING

Final finishing by filing calls for the use of smooth single cut files, both flat and half-round. A triangular scraper and riffle files are useful in removing large lumps of solder, although a perfectly soldered joint should show few imperfections of this type.

Pewter will take a *brilliant, attractive polish*, or it may be dulled to a *dull finish*. If the former is desired, use the usual tripoli felt buffs to remove scratches and file marks, finishing with the rag buff and stick rouge. Clean with soap and water and polish with a soft rag.

A dull finish described in Chapter IV closely approximates the appearance of ancient pewter, inasmuch as the housewife used bath brick and wood ashes or sand, with which to keep her pewter ware clean.



Containers with Cast and Hollow Handles.
(Student Work at the University of Wisconsin.)

Chapter VI

INDUSTRIAL DESIGNING, SPOUT AND COVER CONSTRUCTION

DESIGNS for pewter and silverware are so closely related that the principles are almost interchangeable. The old-time craftsman designed and afterwards executed his conception, thus giving full scope for individuality of expression.

The silverware industry of today includes both sterling silver and plated ware, the latter a soft or hard metal base (frequently britannia) covered with an electrically deposited layer of silver. The shapes are classified as, (1), flat ware, such as spoons, knives, forks; (2), hollow ware, such as tea and coffee sets and similar table forms. Some firms extend this range and enter the field of decorative design, producing pieces for church service, trophies, prize cups, candle sticks, mesh bags, and vanity cases. There are many independent craftsmen who devote their energies to ecclesiastical design. As they make their designs and carry them out in metal, they resemble the craftsmen of the mediaeval guilds.

A silverware or pewter design must have a feeling for good proportion or tempo, interesting contours, play of light and shade produced by contours or mouldings, and modeled designs. The designer sets about his task by selecting the largest piece of a popular set already manufactured, for example a tea or coffee pot. This may be representative of a certain historic period. From this he makes a rough pencil sketch identical in pattern. By changing this form, by modifying it and adding new features, refining its proportions, by adjusting appendages such as spouts, covers, and handles to the body, a new design is evolved and rendered in water color to show textures, color, and light and shade.

This design is submitted to the customer and if accepted, working drawings and blue prints are made and turned over to the factory foreman. If a modeled design is to be added, the designer makes a model of wax and casts it in preliminary form in plaster, from which dies are made for stamping.

The art training of the silverware or pewter metal designer includes freehand drawing, from the object and from life and nature, light and shade, modeling, use of colors for rendering forms, design, including proportion, contours and conventionalization, architectural styles, period fur-

niture, and historic ornament. He must possess a knowledge of methods of design in glass, metal, pottery, plus the necessary technical-crafts factory knowledge. It is interesting to note that with all of this highly specialized art training, designers return again and again to the patterns and ideals of by-gone craftsmen, not only in metal, but in many other crafts.

Illustration 21. Eighteenth and Nineteenth Century English Pewter in Metropolitan Museum.

THE TEA POT

In the preceding chapter, the processes of bending, seaming, and soldering were described as applying to the construction of a cream pitcher. For class problems, a repetition of old laws coupled with new and interesting steps, is a well-tried principle of pedagogy. To adapt this to prac-

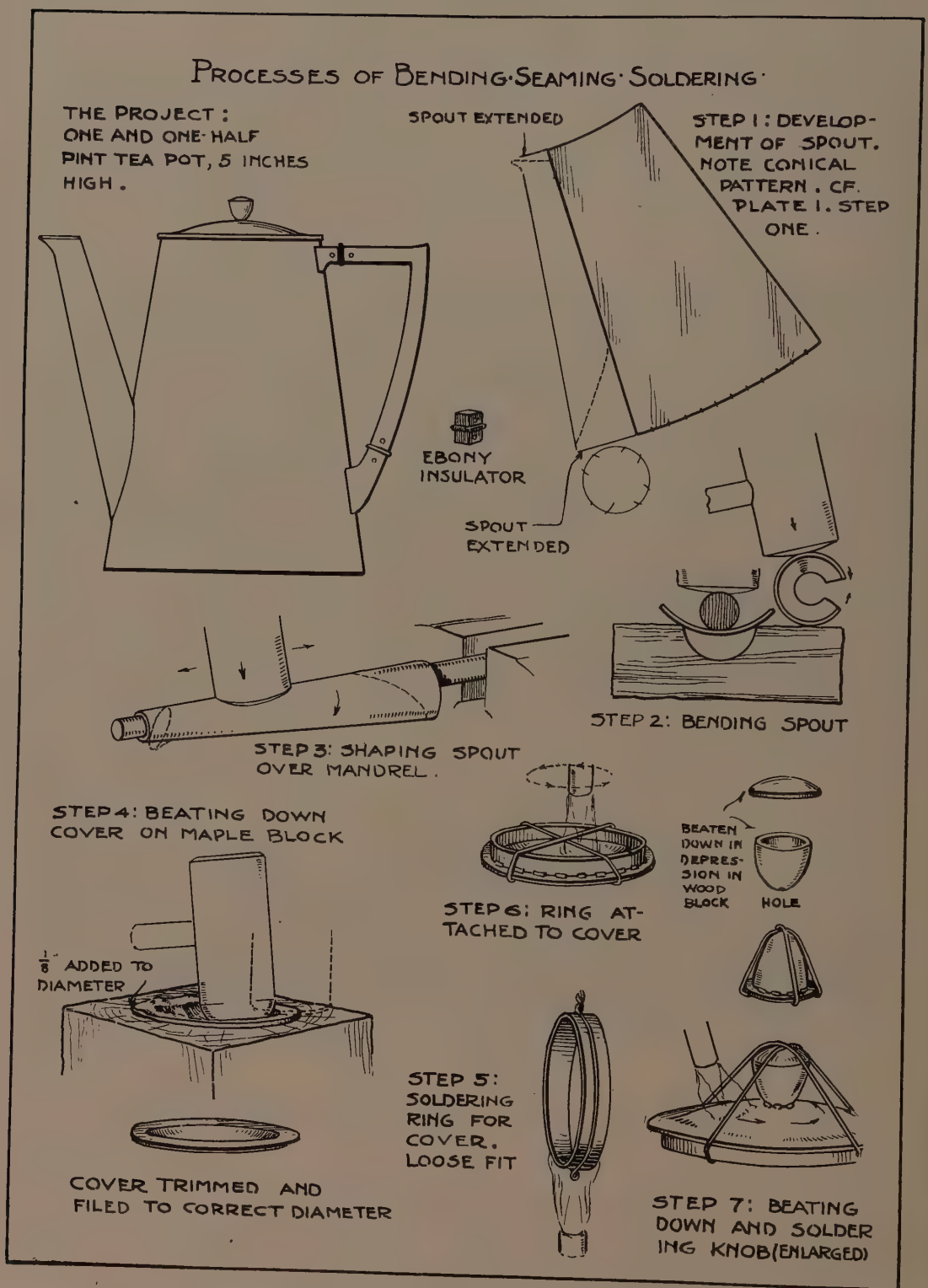

PROCESSES OF BENDING·SEAMING·SOLDERING·
THE PROJECT: ONE AND ONE-HALF PINT TEA POT, 5 INCHES HIGH.
SPOUT EXTENDED
STEP 1: DEVELOPMENT OF SPOUT. NOTE CONICAL PATTERN. CF. PLATE 1. STEP ONE.
EBONY INSULATOR
SPOUT EXTENDED
STEP 2: BENDING SPOUT
STEP 3: SHAPING SPOUT OVER MANDREL.
STEP 4: BEATING DOWN COVER ON MAPLE BLOCK
STEP 6: RING ATTACHED TO COVER
BEATEN DOWN IN DEPRESSION IN WOOD BLOCK
HOLE
1/8" ADDED TO DIAMETER
STEP 5: SOLDERING RING FOR COVER. LOOSE FIT
COVER TRIMMED AND FILED TO CORRECT DIAMETER
STEP 7: BEATING DOWN AND SOLDERING KNOB (ENLARGED)

Plate 11. Processes in the Construction of a Tea Pot.

tice, the construction of a tea pot similar in design to the cream pitcher has been selected as the problem. While the experienced designer has his approach to the problem, the beginner should follow the methods indicated in Chapter III, keeping his motives within near-rectilineal limits.

Illustration 21 shows old pewter tankards, while Illustration 22 is a silver tea pot with wooden handle for insulation, by Paul Revere of Revolutionary fame. However, our design must be much simpler.

Plate 11 is explanatory to this. As the problem is of the elementary type, the design is simple and severe in line, with the interest and beauty concentrated in the contour curves and the textures and color of pewter. The body and handle are constructed by repetitions of Steps 2, 4, 5, 6, and 7, of Plate 10.

Illustration 22. Silver Tea Pot by Paul Revere.
(Courtesy, Boston Museum of Fine Arts.)

The points wherein the steps differ are in size and the insertion of a small ebony or ivory heat insulator in the handle, and in the spout and cover. It is suggested that the handle be completed as a mass and afterwards severed with a hack saw or jeweler's saw, at a point where it is desirable to insert the insulators.

The insulators may be chiseled or filed into shape, inserted, and the ends firmly secured by drilling small holes in the handle, and inserting a section of round pewter wire in position, leaving enough protruding to cap over or rivet.

THE SPOUT

In designing the spout, it is well to remember that the height of the spout outlet controls the height of the liquid in the body of the pot. If the spout outlet is lower than the top of the tea pot, the liquid will run out before the container is fully filled. Structurally, the spout is conical in elevation and circular in cross section with its development for the metal pattern indicated in Step 1, Plate 11.

After the pattern of the spout is cut and the pewter filed to fit, the bending is accomplished by forcing it into a chiseled channel in a hard maple block by means of a round rod of brass or iron placed directly above the metal pattern and above the groove. By tapping the rod with a hammer, the sides of the pattern are drawn into half a cylinder; it is then placed on top of the block, and the sides are brought together, as illustrated in Step 2, Plate 11.

After the spout is soldered, care having been taken to place the solder on the *inside* while administering the heat from without, true it into a perfect cone by the use of a round steel rod, ring mandrel, or tinner's blow-horn stake, according to the size of the spout. In the truing process, the *spout* is turned clock-wise on the mandrel, while the wooden mallet strokes describe a close spiral around the spout from end to end.

Emerging from this step fully trued, the tinner's or jeweler's curved snips will complete an approximate trimming of the ends, and the half-round and flat files will bring the spout into complete contact with the body. This is a difficult piece of filing and has to be done with accuracy or the pot will leak. Drill a number of one-eighth inch holes in the body for tea outlets before attaching the spout.

Many craftsmen prefer to solder both spout and handle to the body before uniting the body to the bottom plate. If this is done, care should be taken to retain the perfect cone shape of the body throughout the respective solderings. The outward curve to the top of the spout is added by the alternate method of lipping. (Plate 10, Step 3.)

THE COVER

The cover offers a true type of *beating down* or stretching the metal into the shape desired. The easiest method of accomplishing this is to turn or chisel from the end of a hard maple block, a hollow of sufficient width and depth to fit the design. Then cutting a circular blank one-eighth of an inch larger than the width of the design, proceed to manipulate the metal by strokes from the hemi-spherical end of the wooden mallet, (Step 4,

Plate 11). Wrinkles in the flat margin, caused by uneven stretching, are eliminated by strokes from the flat end of the mallet. Trim to a true circle the portion of the cover completed, and file smooth.

Step 5, Plate 11, shows the manner of soldering the cover ring, which should be deep enough to keep the lid on the pot when pouring. Thorough fluxing should accompany all of these processes. In assembling the ring

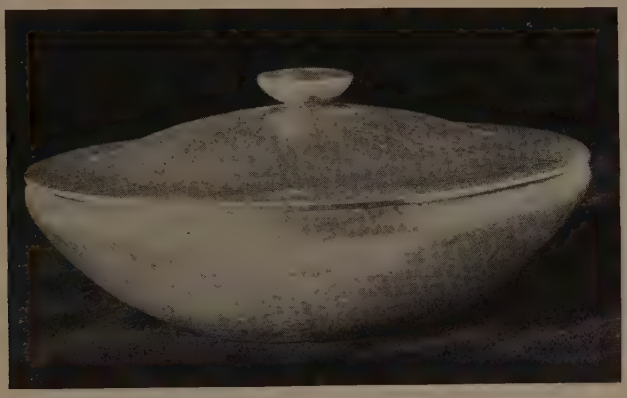


Illustration 23. Planished One-Piece Bowl With Lid and Knob.

and cover in Step 6, Plate 11, the flame is moved in a circular direction within the ring, the idea being to heat the lid thoroughly and to lead the solder through the seam into the inner part of the ring.

THE KNOB

The knob is a two-piece problem. The top indicated in Step 7, Plate 11, may be shaped on the block of Step 4. A depression in the same block made with a large size doming punch forms the mould for beating down the lower portion of the knob in which a small hole is drilled. When the two parts are soldered together, this hole affords an outlet for steam from the flux.

With the surplus material removed after the two parts are soldered together, the knob is slightly flattened at the point of contact, and then is wired to the lid. Again the flame must be directed on the cover around the knob, thus heating the heavier mass, namely, the lid, first; sufficient heat will radiate to warm the knob and flush the solder.

By filing or scraping away surplus solder, by filing all surfaces true, and by softening sharp edges, the problem is polished to harmonize with the cream pitcher by either of the two processes described in Chapters IV and V. The only difficult area to polish is under the knob. Knot together

a number of pieces of coarse string, fasten the knot in the vise and, selecting the required number of strings, apply tripoli and rub the intersection of the knob and lid back and forth. This will give a finished appearance to this part of the pot. Cover and knob construction has a number of possible applications: Illustration 28 gives some of them.

HAMMERED SURFACES

Old pewter was free from hammer marks, and it is our object to work in that direction. When steel hammers and other tools are necessary to the achievement of desired results, we are justified in the use of hammer marks which through their glittering planes give a distinct attraction to the ware and "planish" out unsightly marks. An example of this is shown in the one-piece bowl with lid and knob, of Illustration 23.

A beginner in art metal usually is over-anxious to begin planishing, hence the mention of the topic at this point. He is urged, however, to avoid planishing until that operation becomes necessary in the construction of a problem.

Chapter VII

THE HISTORIC DESIGN APPROACH, LOW RAISING AND THE PORRINGER

THROUGHOUT its history, the art of the pewterer shows little variation, either in composition or in improved methods of production.

In a way, this condition is paralleled in pewter *design*, inasmuch as there are no definite division points like the Chippendale, Heppelwhite, and Wedgwood periods of other crafts. We may divide pewter designs loosely into Mediaeval, Elizabethan, Stuart, and Late (including Colonial) if we like, but unfortunately there are no clearly marked and distinguishing characteristics of those epochs. For example, the tea pot of Chapter VI, in its cone-shaped sides and straight spout, bears a resemblance to a similar English pattern of 1770, but there were many other tea pots or similar forms designed at the same time, varying from this type.

We do know, however, that the pewterers' art is one wherein imitation of the work of contemporary gold and silversmiths became the rule. If many designs were plagiarized, it was with a full understanding of the limitations of pewter.

THE HISTORIC BACKGROUND

To teachers and students of the art crafts, it is becoming more and more apparent that, in order to develop designs in the true spirit of past ages, some distinct type of preparation is vital. One cannot plunge into Queen Anne or William-and-Mary periods and, in a haphazard fashion, drag out some pattern. One must understand something of the history of the times, the spirit in which the Dutch and English craftsman-designer approached his problem. One may capture a William-and-Mary chair leg here, a chair back there, and attempt to assemble them in an incongruous design entirely out of proportion to the character and spirit of that period and type of furniture, but the result usually is a failure.

A serious study of historic styles is necessary if we are to avoid a bastardly design. Mr. Richards, in his recent book "Art in Industry," proves from positive data that a knowledge of historic styles is demanded by designers in nearly every large industry dealing with period production. Either as a cultural or a vocational subject, historic ornament will show its worth.

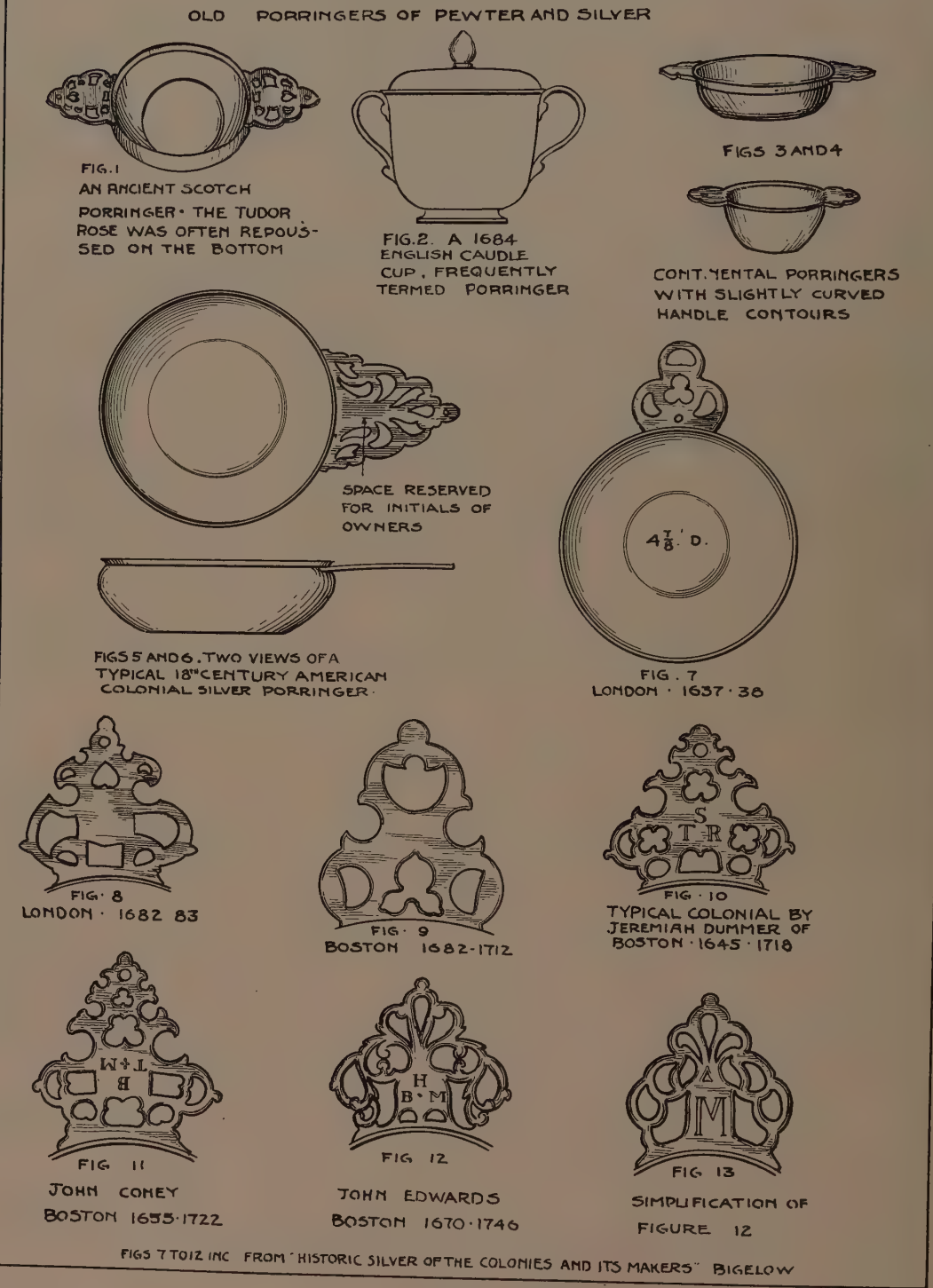

OLD PORRINGERS OF PEWTER AND SILVER
FIG. 1
AN ANCIENT SCOTCH PORRINGER · THE TUDOR ROSE WAS OFTEN REPOUSSED ON THE BOTTOM
FIG. 2. A 1684 ENGLISH CAUDLE CUP, FREQUENTLY TERMED PORRINGER
FIGS 3 AND 4
CONTINENTAL PORRINGERS WITH SLIGHTLY CURVED HANDLE CONTOURS
SPACE RESERVED FOR INITIALS OF OWNERS
FIGS 5 AND 6. TWO VIEWS OF A TYPICAL 18TH CENTURY AMERICAN COLONIAL SILVER PORRINGER
FIG. 7
LONDON · 1637 · 38
FIG. 8
LONDON · 1682 83
FIG. 9
BOSTON 1682-1712
FIG. 10
TYPICAL COLONIAL BY JEREMIAH DUMMER OF BOSTON · 1645 · 1718
FIG 11
JOHN COMEY
BOSTON 1655·1722
FIG 12
JOHN EDWARDS
BOSTON 1670·1746
FIG 13
SIMPLIFICATION OF FIGURE 12
FIGS 7 TO 12 INC FROM "HISTORIC SILVER OF THE COLONIES AND ITS MAKERS" BIGELOW

Plate 12. Historic Porringers.

PORRINGERS

With this historic past in mind, the next project is selected from a distinct period, namely the American Colonial, and for the problem, a low bowl or porringer with one "ear" or handle is chosen. Museums exhibit many porringers, both in silver and pewter, (Illustrations 24 and 25). In the past these bowls had varied uses, some for wine-tasters, others as containers for the blood which surgeons and barbers were prone to remove from patients with fever, although this use of the porringer is a contested point.

Illustration 24. Early American Pewter Porringer With Cast Handles.
(Courtesy of the Wisconsin Historical Museum, Madison.)

Harrison (1577-87) wrote: "Of porringers . . . and others like I speak not, albeit that in the making of all these things there is such exquisite diligence used, I mean of mixtures of the metall and true making of this commoditie (by reason of sharpe laws provided on that behalfe) as is not to be found in any other trade."

The French used a high and thick cast porringer for vegetables. These date back to a very early period when they were known as *esculles*. Possibly through association with the pantry, this word became anglicised to *squillery*, and finally to the modern word scullery. These high porringers were probably similar to Figures 3 and 4, Plate 12, as their sizes (approximating six and three-fourths inches) and shapes would indicate.

The ancient Scotch porringer of Figure 1, Plate 12, was undoubtedly a forerunner of the later type seen in Figure 6. A graceful high bowl with lid, used to contain *caudle*, an early English drink, was occasionally called porringer. The problem for this chapter began its career in England during the last half of the Seventeenth Century, emerging from a variety of shapes and under the name of *counterfette*, or porringer, serving as a container for soft foods and for *parraitch*.

This form, similar to Figures 5 and 6, Plate 12, came to the American Colonies, and was produced and used for a variety of purposes. One design shows a cover added, with the idea of using the bowl for sugar. Many of these Colonial bowls are still in use for salad dressing, confectionery, card and ash receivers, nuts, vegetables, and as children's bowls.

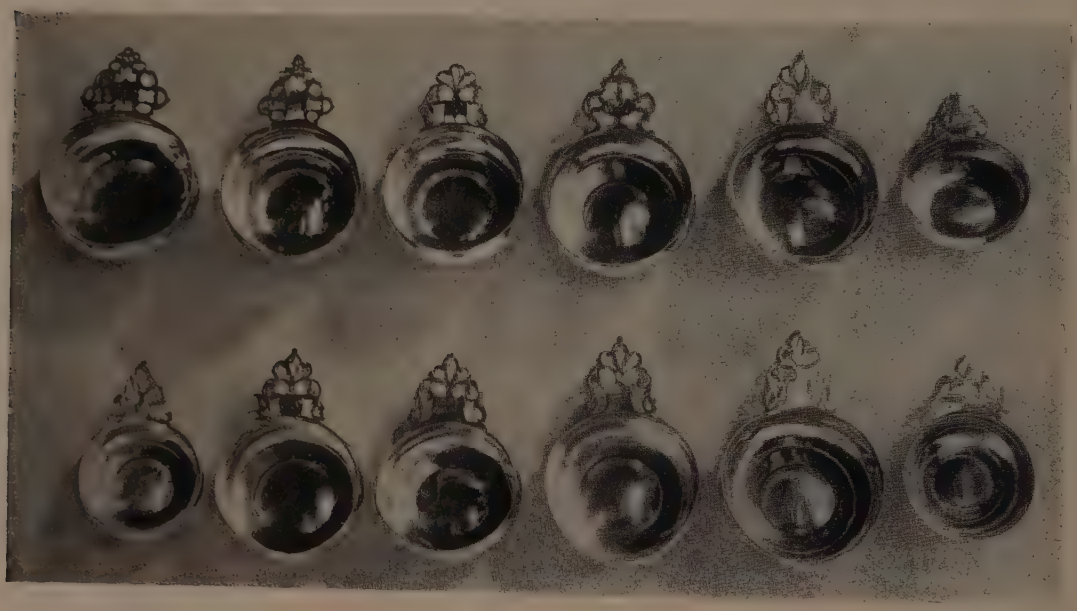


Illustration 25. Seventeenth and Eighteenth Century American Silver Porringers With One Handle.

THE DESIGN

The outline of the body of the Colonial porringer varies but little; the individuality of the maker appears in the handles. For this problem, we may assume the curve shown in Figure 5, Plate 12, as typical, omitting for technical simplicity the upper outward projection. The contour curve is pleasing in its variety, while its sturdy but graceful sweep is suited to pewter construction.

The handles are enriched by pierced or fretted patterns. As these have survived the wear of centuries, we may well adapt this form of enrichment. Our problem then is to adopt the bowl contour, choosing a width from within the ranges given on Plate 13, Figure 1, and restricting the height to one and three-fourths inches or less. The diagram of Figure 5, Plate 16, gives a good method of determining the contours.

As the design emphasis rests in the handles, it is well to consider what problems are involved: (1) As the handles are appendages in plain view, they must join the bowl in a harmonious manner and preferably with a tangential or a right angle junction. (2) The handle must have aesthetic proportions properly to balance the bowl (best studied in a top plan view), while the utilitarian proportions must be so planned that the bowl will not be tipped by its weight. (3) The pierced enrichment should present a unified appearance as opposed to a "spotty" design. Furthermore, the pierced units are to conform to the outside contour, and must form a harmonious transition from the bowl to the apex of the handle. (4) The design must be in the "spirit" of the period — adapted to pewter design.

The handles in Plate 12 are typical specimens one finds in technical books on the subject. They were constructed in silver, but the parallel between pewter and silver design is close. The examples range chronologically from 1637 to 1746, covering the period we have selected, and geographically from London, the parent source of this type of pattern, to Colonial America, the territory of our problem. One notices a marked similarity of pattern between the English designs and those used in this country. This marks the spread of style or influence, just as in our day, Parisian styles quickly appear in New York.

What is the spirit of the patterns? From study, we see that they are frankly formal, geometric in character, normally to be expected from our Puritan ancestors. This type of surface enrichment is called piercing. The Gothic trefoil (three lapping circles) and the compass arc may be seen in Figure 7, Plate 12. The three lobes of the trefoil, elaborated by various arcs, semi-circles, quatrefoils, and the like are plainly to be traced in other patterns, fitting into a metrical net of tempo 1, the proportion of the porringer top seen in the plan. In the pattern of Figure 12, Mr. Edwards has modified the severity of the circle by the classic scroll, a Colonial characteristic, but the influence of the original trefoil pattern is noticed in the shape of the contours.

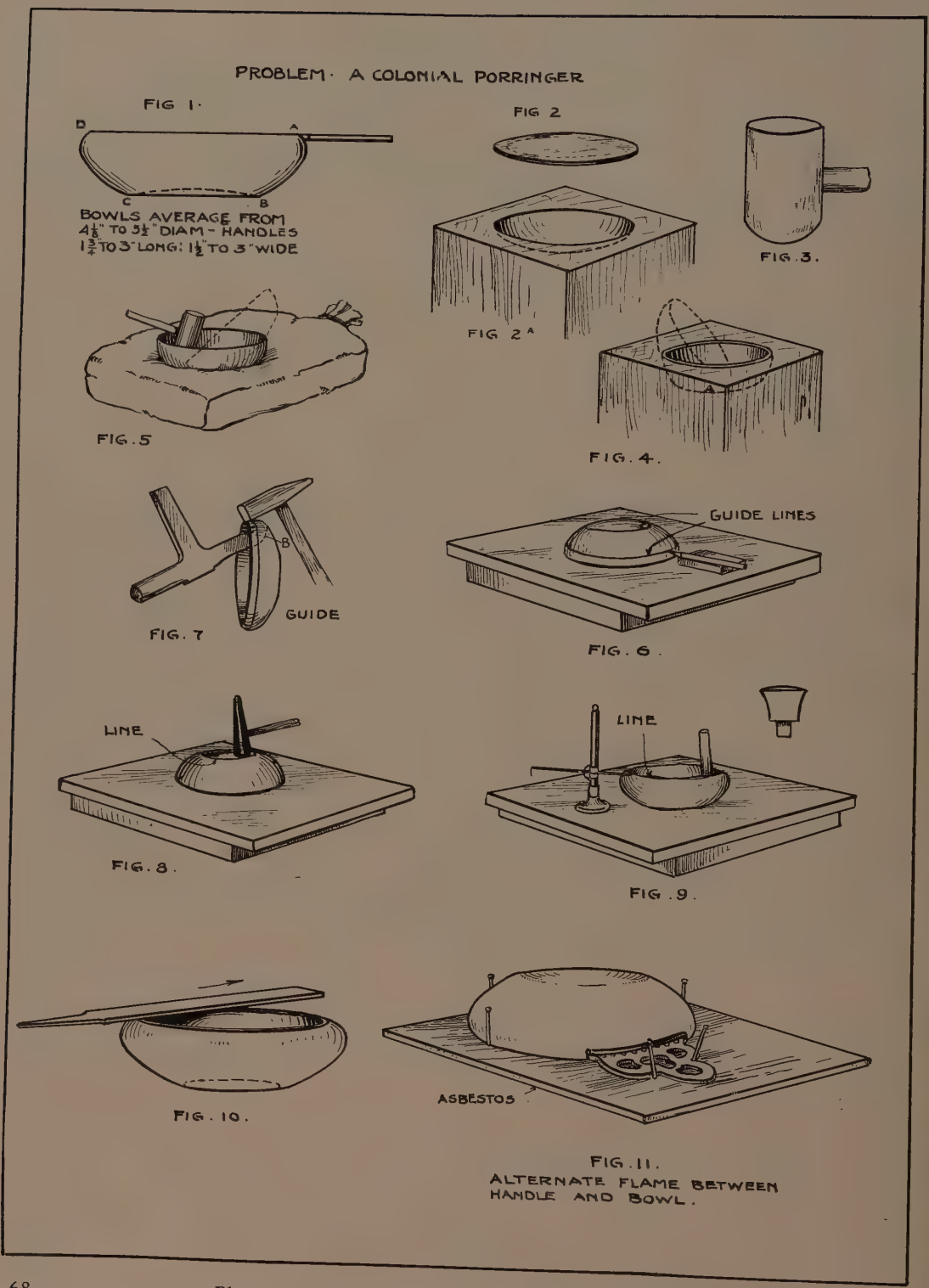


Plate 13. Processes in the Construction of a Porringer.

It may be said that the period elements are grouped into a formal balance marked by a near-pointed terminal, a broad base, with bounding contours corresponding broadly to a trefoil pattern. Let us test the various patterns by the design rules indicated in a previous paragraph: (1) All the handles join the bowl in a harmonious manner; (2) the handles shown are well balanced with the bowl; (3) Figures 10, 11, 12, and 13 show the best harmonious arrangement of pierced spots; Figure 9 has a scattered appearance, while the lower fretted areas fail to connect with either bowl or contour; Figure 7 shows less pleasing relationship between spots, while the amount of metal remaining uncut gives a clumsy and heavy aspect to the design.

Note the almost universal appearance of the hole at the handle terminal. The porringer was suspended from a wall hook passed through this hole. One must not forget to consider the part played by the shaded Roman initials of the owners as they help to balance the design, while adding marks of distinction to the ware.

(4) In translating these designs to pewter, adding our own arrangement but retaining the original spirit of pattern design, it is well to avoid small projecting points and other structurally weak areas. Figure 13, Plate 12, shows an adaptation of Figure 12, with areas of sufficient strength to withstand wear.

To maintain the character of the originals, initials should be engraved. Lacking knowledge of this, a block Gothic letter may be attached by soldering. After several trial sketches of handles have been worked out on the metrical net, one should be selected, perfected, and added to the full size working drawing of the bowl. The handle is flush with the top of the bowl, as we have illustrated in Figure 1, Plate 13. Two views, a side and top elevation, are essential.

THE CONSTRUCTION

From the working drawing, one proceeds to cut a circular blank of 18-gauge No. 2 sheet britannia metal. The diameter of this disc is ascertained by placing the end of a string or piece of binding wire at point A, Figure 1, Plate 13. Fit the string to the exact contour, passing through points B and C, terminating at D. Measure this string; this gives the exact length of the profile. Add one-half inch to this for trimming and cut the blank illustrated in Figure 2, Plate 13.

A block of hard maple should be hollowed slightly (Figure 2a, Plate 13), and with the round end of the wooden mallet of Figure 3, the blank

should be domed to the shape of a flattened saucer, using care to work along the outer portion of the blank, on a path shown by the dotted line of Figure 2. A second block is turned exactly to conform to the final shape of the porringer, with the exception of two points: (1) The bottom of the bowl should be allowed to curve *slightly* downward as at point A, Figure 4, and (2) the porringer should be carried upward from its point of greatest width. The curve toward the rim is left for a later operation. Continue the beating-down process until the bowl assumes the correct curvatures. The partially domed bowl may be tipped at an angle, which often facilitates the shaping process.

If one does not have a turning lathe, an admirable substitute for the maple blocks may be found in a strong canvas bag filled with sand. With the mallet used on the maple forms, work slowly, following the outer contour of the blank. If the bowl does not exceed one and three-fourths inches in height, little trouble with splitting will be encountered. A template exactly conforming to the contour should be used in the manner of the try-square, testing the bowl for inaccurate curvature. If wrinkles appear, place the bowl on a flat surface and hammer them out.

The embryonic porringer is now inverted on a surface plate or other plane surface, and pencil guide lines are drawn at two points; at the point of greatest curvature and at the point of contact for the base, or the resting point of the form.

RAISING

A tee stake, as in Figure 7, Plate 13, is locked in a vise. The bowl is grasped in the left hand and by the rim, the forefinger is extended within the bowl and touching the end of the stake at point B, acting as a guide.

The object of this operation is as follows: With the flat end of the wooden mallet, the bowl is struck a sharp blow in the approximate direction illustrated in Figure 7. If the mallet meets the metal directly above the point of contact with the stake, nothing occurs; if the stroke is administered one-eighth of an inch in front of the point of contact, the metal is forced inward. If the porringer is rotated in the direction of the hands of a clock and another blow is struck, the inward curve is continued. Applying this, place the bowl with the guide line in exact contact with the stake, then strike one-eighth of an inch in advance of this point. Using the guide line as a gauge, continue entirely around the bowl. This is termed *coursing* around the bowl.

Tip the lower portion of the bowl away from you and continue coursing slightly nearer the edge and entirely around the bowl. Repeat this

until the edge of the bowl is reached, allowing all blows to overlap each other. This is a difficult process and takes time to perfect. Beating down stretches the metal; raising is frequently used to contract it, as in the present instance. As the surplus stock accumulates, the contracted metal has a tendency to wrinkle. Overlapping wrinkles are disastrous; if they appear, hammer them out on a flat surface.

If the correct curve is not secured, repeat the operation, bearing in mind the fact that the slower the raising process, the less the likelihood of splitting or wrinkling. Raising is a very ancient process; in the history of the craft, the hammer-men are referred to repeatedly. The importance of the complete raising process cannot be overestimated.

Structurally it will be found that the bowl is much improved, as the inward curve has strengthened the rim to a marked extent. After testing the curves with a template, the bowl is again inverted on the surface plate. The base, which now has a slight curvature outward, is driven down with the rounding end of a horn or wooden mallet, care being taken to hit lightly and evenly, just within the base guide lines. Repeat concentrically but nearer to the center until the base curves slightly inward to the desired extent.

The base may be brought into complete contact with the table by tapping lightly on a round end dowel held upright, as in Figure 9. Slight imperfections in the bottom may be corrected by placing the bowl on the mushroom stake, Figure 9, Plate 13, and lightly tapping the inside of the bowl, with the flat end of a wooden mallet.

With the surface gauge, draw a cutting line around the bowl at a point determined by the working drawing; trim with jewelers' curved snips and file to the line (Figure 10). If much material has to be removed, use a double-cut hand file and finish with a single-cut smooth file. Remove the burr and soften the edge with fine emery paper.

THE HANDLE

The handle is to be made of No. 1 britannia, preferably from 14 gauge stock, provided this will not overbalance the body. The design is traced upon thin paper, transferred to the metal by means of carbon paper, and made permanent by the use of the scratch point. The first step is to cut out the fretted or pierced units. Using a center punch, locate one or more holes in each unit. With a hand drill, bore small holes at each center-punch mark for inserting the saw blade.

With a six-inch jeweler's saw frame and a No. 0 saw blade, cut out each compartment just within the scratch point lines. True to the line with coarse needle files; follow this by cutting the handle contours and likewise filing to the outline. In Colonial ware, we find the handle edges and pierced holes slightly softened, which added interesting high lights on the edges and gave the effect of a slightly modeled surface. Small strips of fine emery paper will give the same effect to the handles of this problem.

The method of soldering the handle to the body is illustrated in Figure 11, Plate 13. The bowl and handle are brought into contact and held by small brads; the solder is placed along the point of contact, while the joint is flushed by an even distribution of heat to both members. If light weight metal has to be used for the handle, it becomes necessary to reinforce the joint by adding a small strip of quarter-round britannia, attached to the body by small pieces of solder. Difficulty may be encountered in retaining the reinforcement in place, prior to soldering. One may overcome the difficulty by bending a brad at right angles, and inserting it into the sheet of asbestos, with the hooked end resting upon the added strip; place other brads similarly bent from end to end.

All scratches should be removed by fine emery paper and oil, and a dull finish given the entire porringer, as explained in previous chapters. New tools for this problem are as follows: Surface plate and gauge, tee stake, mushroom or bottoming stake, rectangularly shaped wooden mallet, horn hammer, curved jeweler's snips, saw frame (six inches), one dozen No. 0 blades, hand drill and small No. 12 twist drills. The sketches show substitutes for the surface gauge, while any hard plane smooth surface will prove a fair substitute for the surface plate. The other items are comparatively inexpensive.

The low raised bowl has many interesting variations. Note the Illustrations 5 and 6, page 16, and Illustration 20, page 54. These cuts show how creamers and teapots of Chapters V and VI may have new interest added by drawing in their bases into curves by the steps illustrated in Plate 13, harmonizing with the vertical contours.

"If the past has done so much and so well, shall we with such a heritage do less and fail?"—C. Howard Walker.

Chapter VIII

SOME RELATED PROBLEMS

WHILE the project method of presentation in this book may seem arbitrary, one familiar with teaching art-metal work soon realizes that certain problems seem to be especially adapted to the logical development of specific technical processes. For example, the low plate is an excellent vehicle for the beating down process, as is the low bowl for elementary raising.

To avoid a dogmatic outline, it should be understood that each problem of the series has a number of variations capable of being used to advantage. The present chapter is intended to suggest a few of the many possible combinations, made by the author's students, from 18-gauge No. 1 britannia.

Illustration 26. Set of Dutch Beakers.

A CIDER SET

Illustration 26 consists of a set of cider or lemonade beakers of Dutch pattern. The body is shaped into a cylindrical form, wired as in Figure 1, Plate 14; the solder snippets are placed in the interior and along the joint, followed by the application of a small bunsen flame to the outside of the cylinder.

After reshaping on a cylindrical mandrel or shaft, secure the bottom plate in position, Figure 2, Plate 14, and to avoid opening the previous joints, bind wire around the cylinder. After soldering, trim off the excess metal with a jeweler's snips and file flush.

The foot or base may be cast and turned, as described in a later chapter, or beaten. In developing the latter process, form a ring of the desired height, Figure 3, Plate 14, making a snug fit with the beaker base. Flare out by beating down with the round end of a horn hammer, working from the inside of the ring on a hard wood block, correctly shaped with gouge, files, and sandpaper; Figure 4, Plate 14. Rotating the ring clock-wise,

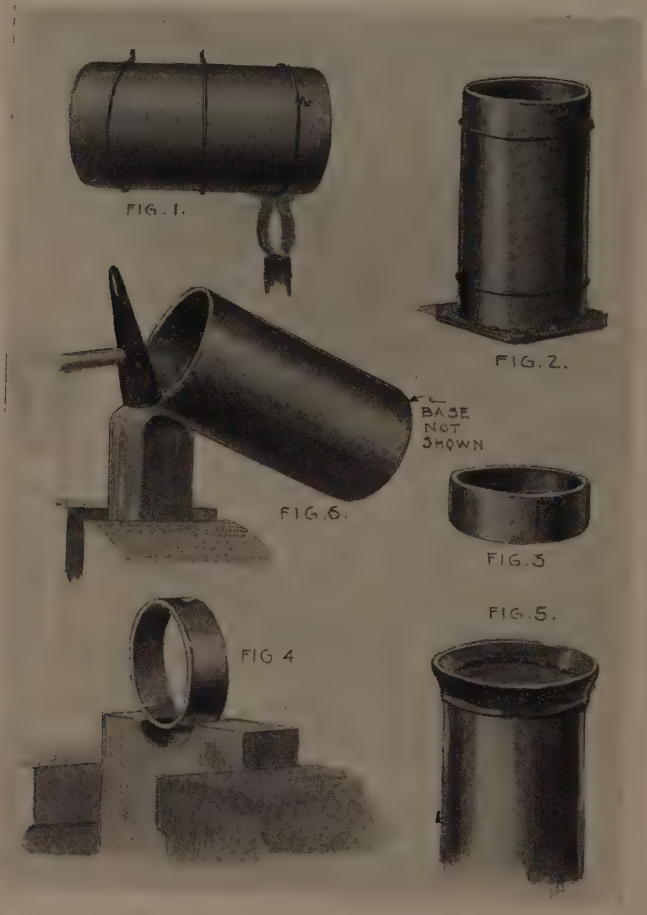


Plate 14. Processes in the Construction of a Beaker.

shape it with fairly light strokes overlapping each other, starting at the beginning of the expansion and progressing in spiral series toward the outer rim.

It will take two or three repetitions of this process before the full curve is secured. Work gradually, as haste in stretching generally results in splitting the metal.

After shaping, apply the foot to the beaker body and solder, as in Figure 5, taking the precaution to wire it securely in position. The problem is completed by giving an outward flare to the top, following the method of Figure 6, Plate 14, rotating the beaker clock-wise, and working slowly in a spiral pathway toward the rim which may be further strengthened by reeding.

An attractive dull finish may be produced by fine emery cloth and oil, followed by powdered pumice and water. To give a brilliant polish to the interior, use a small round felt buff and tripoli and a flat felt *bottoming or case buff*.

LOW PLATES

Low plates of the type shown in Illustration 27 are developed by variations of the technic described in Chapter IV. Surface enrichment and color have been supplied by small medallions of either transparent or

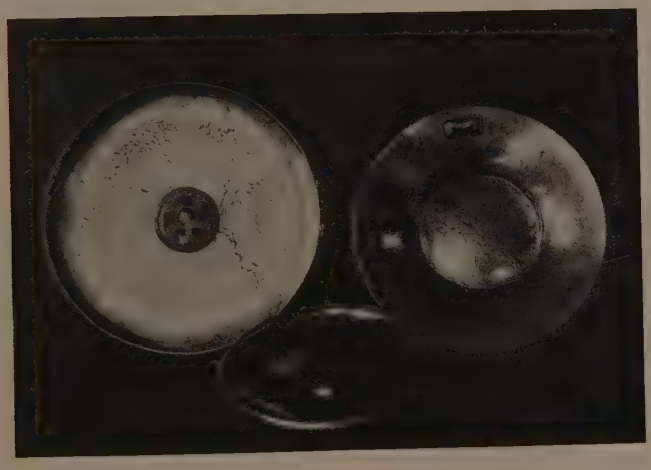


Illustration 27. Plate Developed by the Beating-Down Process.

opaque enamel. A small circle of 18-gauge copper is domed slightly, Figures 1 and 2, Plate 15, cleaned with nitric acid, and on its crowning side covered with an appropriately harmonious enamel which has been ground under water in an agate mortar to the consistency of salt. Care should be taken to wash clear enamel free from all milky substances. A fuller treatment of the enameling process will be found in many current textbooks on art metal work.

Resting the medallion on a wire screen, fire to a smooth surface over a bunsen flame, at first applying the heat slowly to drive off water and its ultimate steam.

To mount the enamel disc, form a ring or bezel of pewter, making a loose fit around the disc and sufficiently high to press over the medallion top one-sixteenth of an inch.

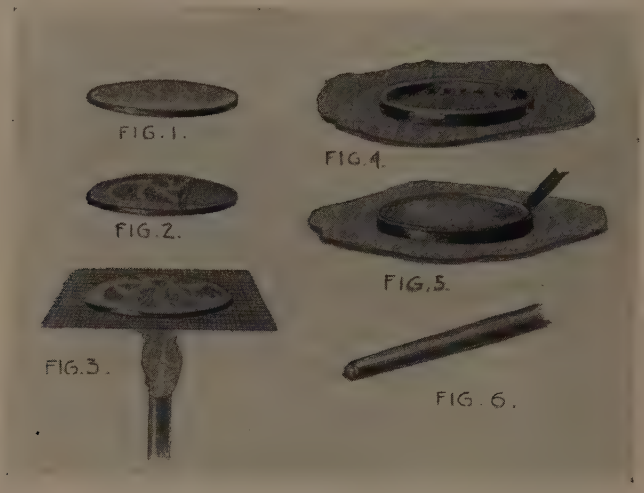


Plate 15. Steps in the Construction of Enamel Medallions.

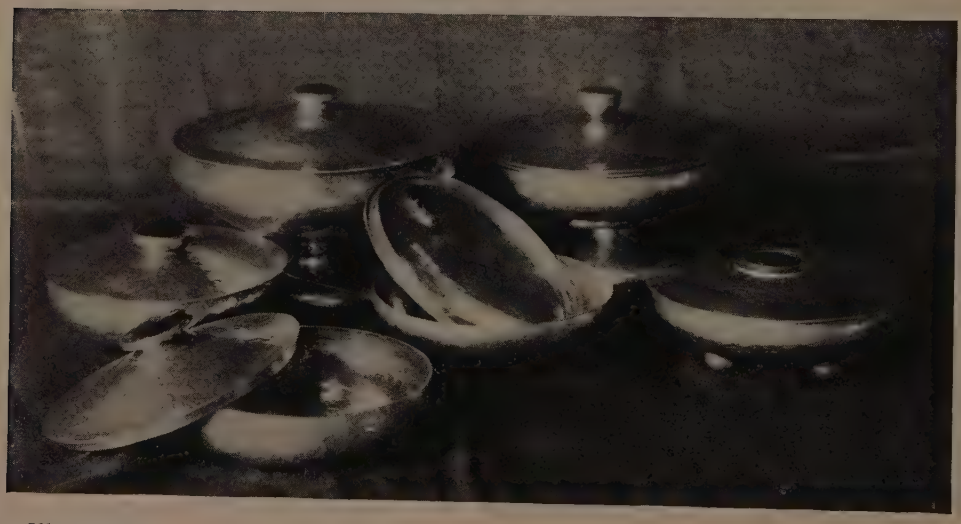


Illustration 28. Low-Raised Bowls With Beaten-Down Covers and Enamelled Knobs.

File the top edge thin to facilitate the pressing process, and solder as in Figure 4, Plate 15. Insert the medallion and with a slightly rounded steel tool, like Figure 6, chase or burnish the pewter gently over the disc, tapping the tool lightly with the small chasing hammer. Figure 5, Plate

15, shows this process which may be completed by polishing the bezel with tripoli and a one and one-fourth inch crevice felt buff.

KNOBS

The raising process described in Chapter VII and the cover technic described in Chapter VI are combined in making the bowls of Illustration 28.

For color enrichment, small discs of enamel may be set in the knob tops. As the process of enamelling of these discs has been briefly explained, it is only necessary to comment on the cover and the knobs.

Illustration 29. A Creamer of Britannia Ware.
(Courtesy of Reed & Barton.)

The simpler knobs or handles, Illustration 28, are described sufficiently in Chapter VI. The example in the lower left corner of the illustration is made in two parts. A round ring of sufficient height is hammered over a grooved steel mandrel, Figure 1, Plate 16, until the correct curvature is attained, afterwards filing to correct the edges. Upon this, a small circular box, Figure 3, Plate 16, is located and is soldered in place to form a bezel for the enamel.

The medallion is then dropped into position, and the edges of the bezel are burnished until the enamel is secure. An attractive variation for setting the discs is seen in the right-hand bowl of Illustration 28, with its retainer detailed in Figure 4, Plate 16, shaped from a cylindrical ring.

Difficulty may be experienced in shaping the lids, hence attention is directed to Figures 6 and 7, Plate 16. If the lid is shaped or raised, like

Figure 6, over a mushroom stake, and placed on a surface plate, we may use the round end of a wooden mallet and with light strokes directed near the circumference, soon get the desired reverse curve of Figure 7, Plate 16.

As an aid to designing low bowls, Figure 5, Plate 16, shows the designer's enclosing rectangle of a desired tempo. Tempos of 1.61 or 2.23

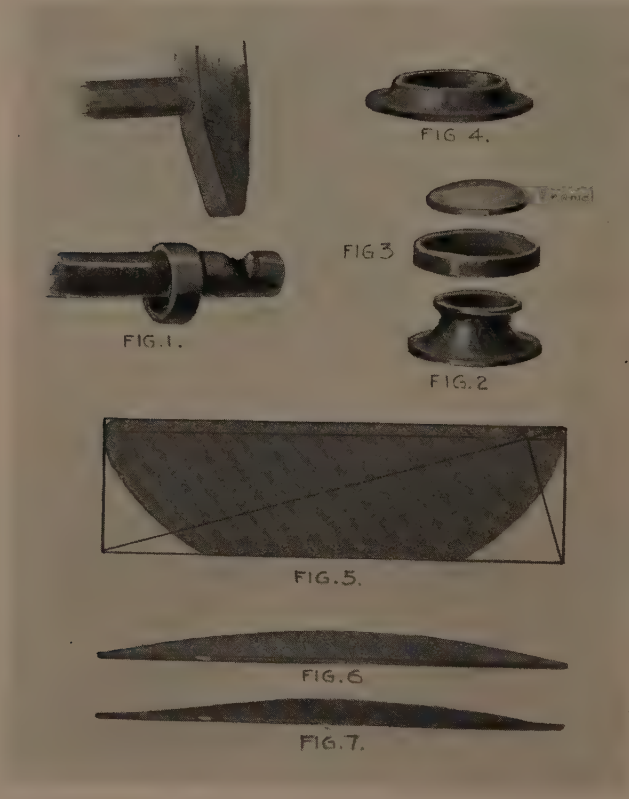


Plate 16. Details of Construction of Low Bowl Knobs.

form good enclosing areas. Point x is determined by drawing a diagonal of the enclosing area, and constructing a line from the right lower corner at right angles to the diagonal. If a horizontal line be drawn through x, cutting the short ends of the enclosing rectangle, very desirable turning points for the bowl are located in good design relationship to the height of the bowl.

Chapter IX

HIGH RAISING AND FORGING

THE ancient pewterers recognized grades of technical progression. For example, the early French workmen were differentiated into slightly differing guild organizations as follows:

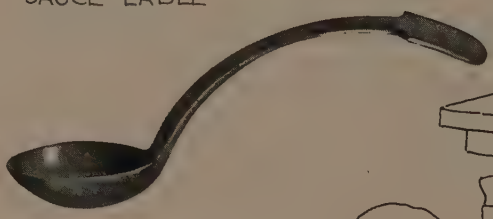
1. *Les Potiers Dits de Round* who were required to raise a vase in one piece before being admitted to the *maitrise*. The process is a difficult bit of hammer work and hardly adapted to school pewter problems.

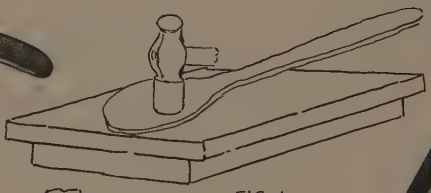
Illustration 30. Excellent Pewter Outline and Tempo.

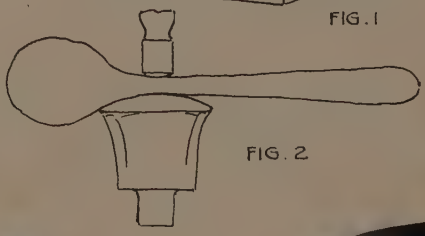
Illustration 31. Pewter Pitcher With Hinged Lid.

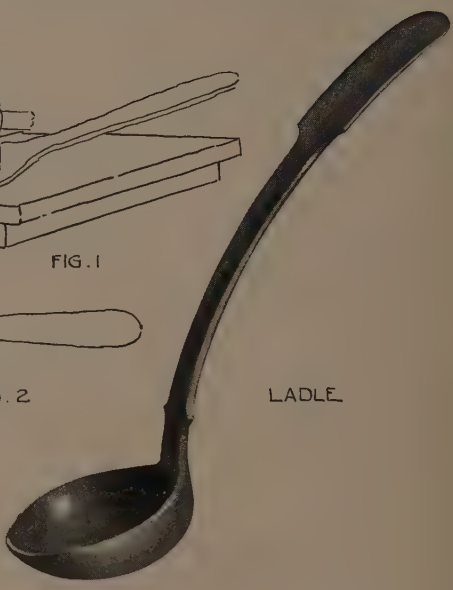
2. *Les Potiers Maitres de Forge.* This guild placed its qualifications upon the ability of its workmen to make a bowl and a dish with the hammer.

3. *Les Potiers Menuisiers* who were concerned in the making of small articles like toys, badges, and rings. According to Masse, they were required to make some small article, like an inkstand, to illustrate their

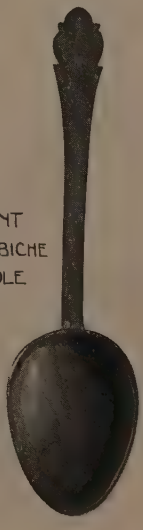








17 CENTURY
ENGLISH SPOON



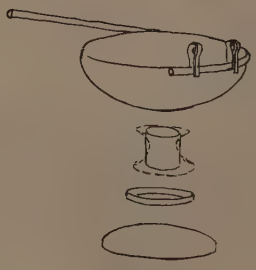


FIG. 3.

INDIVIDUAL
SALT

LOVING CUP OR
TROPHY. 4" HIGH

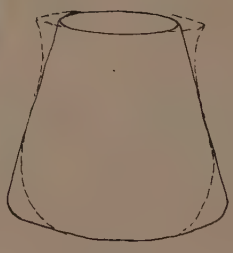


FIG. 4.

EGG CUP

W.H.V.

Plate 17. Miscellaneous Raised and Forged Problems.

proficiency. These test articles were in the nature of a modern essay, marking the ability of the craftsman.

Included in the list of articles in Chapter II, a number of examples calling for the production of a high raised curvilineal form are found. In designing such forms, American ideals of the Colonial period, or early English standards making for simplicity and permanence, should be regarded as the design goal.

Illustration 30 depicts an excellent model with its robustness of body lines and delicacy of neck and base, combined with a sense of permanence and good proportion. Illustrations 31 and 32 are equally good. While the bases in the illustration are turned, it is possible to get excellent results from the raising process, with the simplification of moldings for technical reasons.

Plate 17 represents other illustrations selected from the list of articles to which we have referred. Variety in problem selection is urged. The stereotyped pen trays and card receivers of many art craft courses fail to do justice either to the imagination of the instructor or to the rich possibilities of which the material is capable.

Illustration 32. English Water Pitcher with Robust Body and Delicate Neck and Base.

The spoons and ladles in Plate 17 and Illustration 34 are of comparatively modern pattern; among the ancient pewterers, these articles were in the hands of the *triflers*, or workers in the *trifle* metal, who were concerned with making lighter ware. Indifferent workmen were retained as spoon makers, the cleverer men being advanced to the sad ware branch of the trade. Occasionally, spoon making was reserved for men with defective vision. The earlier spoons were finished by hammering. Often being weak in construction, they failed to resist the necessary pressure of daily use and, consequently, few old spoons are to be found in the hands of pewter collectors. The thinness of the stem and the strain upon the point where it joins the bowl rendered the stem liable to serious damage. Hence, in designing both

ladles and spoons, it becomes necessary to thicken this part of the article. This will be seen by referring to modern silver table spoons, although proportionately pewter must be much thicker.

Bowls of early spoons were narrow where modern spoons are broad, as shown in the Seventeenth Century English spoon of Plate 17. A transitional type trending towards modern design is illustrated by the *Pied de Biche* (deer's foot) spoon in the same plate.

In constructing both spoons and ladles, it is well to cast or solder together a thick form, roughly suggesting the desired shape in the flat, afterwards expanding the bowl of the spoon, as in Figure 1 of Plate 17. By turning the blank edgewise on a mushroom anvil, the stem may be made thicker and stronger, Figure 2. After this process, the spoon or ladle is sawed and filed to the correct contour and is then polished, the spoon being finished by shaping the bowl within a hollowed block of hard maple.

Figure 3, Plate 17, is a detailed constructional view of the parts included in the individual salt, with a variation, in Illustration 34. Unfortunately, the massive master salt which formerly occupied such a prominent place in the table service no longer is in current use. The four parts necessary to produce the individual salt are formed by the raising processes previously described. By turning the base member from a cast cylinder, it becomes possible to construct the salt container in two major parts. Strengthening the rims of both the salt and the egg cup, by means of half-round wire, adds strength and service to the objects and delicacy to their design.

Many olden cups and vases will suggest trophies for athletic or forensic contests. Whenever Sterling silver is undesirable, pewter offers a valuable substitute; moreover, the making of a cup will become an excellent class project in which many can participate. A suggestion for a trophy of simple design is given in Plate 17. Figure 4 indicates the major construction of the cup as follows: A cone shaped body is soldered with a butt joint, expanded at one end over a round end stake and contracted over a T stake to form the base. A round plate is attached to the base, and the problem is completed by attaching cast handles described in Chapter X.

METHODS FOR HIGH RAISING

Methods for raising a high cylindrical form similar, for example, to Illustration 30, require slightly different methods of attack from those previously considered. Plate 18 illustrates a detailing of the process. A cylinder of britannia, slightly less in height than the desired design and in diameter equal to the greatest diameter of the project, is securely soldered by butt joint construction. For large ware at least seven or eight inches

high, a piece of hard maple one and one-half inches thick is shaped as in Figure 2, Plate 18. Place the cylinder of Figure 1 on the stake, and proceed to give a series of light overlapping strokes around the cylinder with the

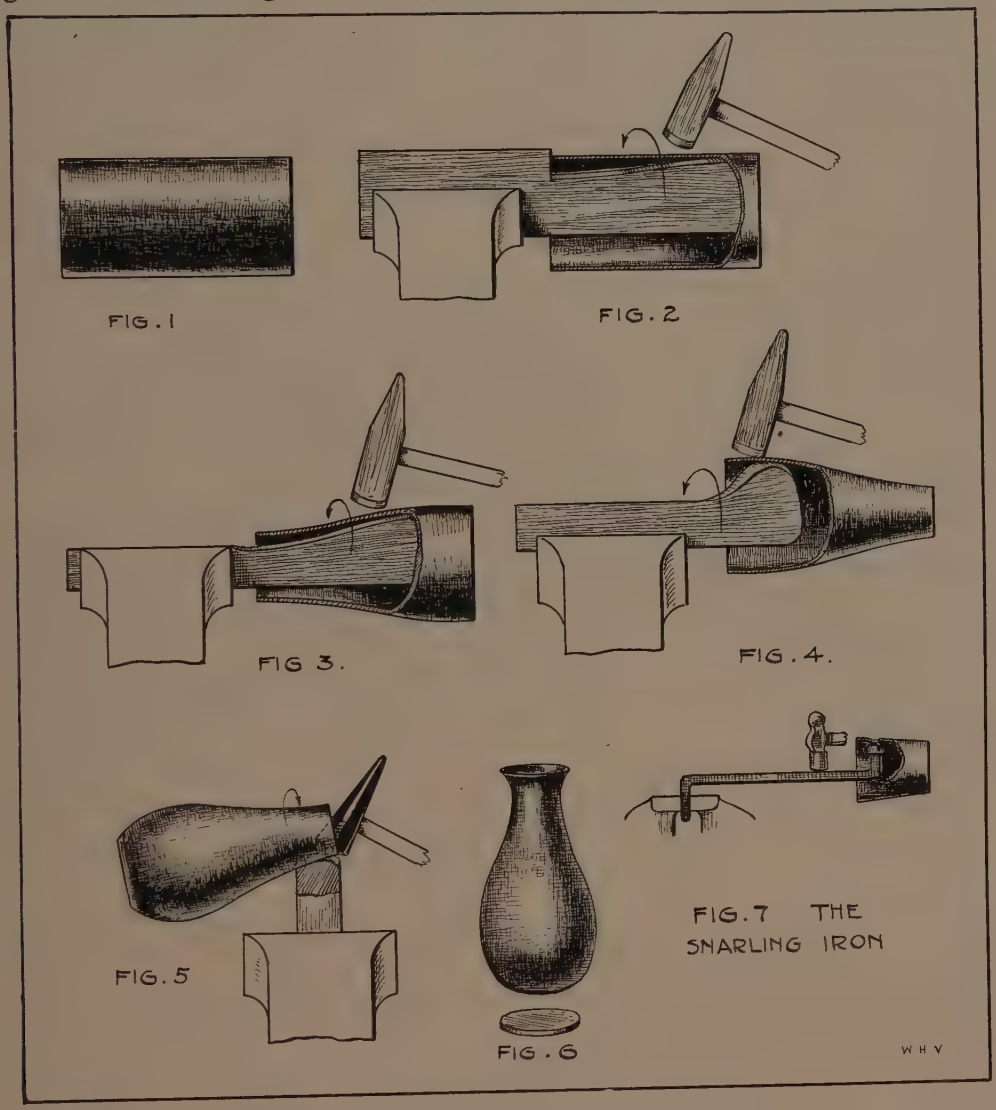


Plate 18. Details of the Process of High Raising.

wooden raising mallet. Begin this process at a point where the design starts to curve toward the neck, thus forcing the metal in about one-eighth of an inch until contact with the stake is secured. As was the case with low raised forms, the cylinder is rotated by the left hand. The cylinder can be fed under the mallet to the extent of three strokes; then a pause should

be made while the left hand takes a fresh grasp of the cylinder and three more blows are struck and so on, as previously detailed. The mallet remains in exactly the same place, and the cylinder is fed under it until a complete circuit of the form is attained. The hammer hand is then advanced about one-half inch, and a new circuit is started, practically overlapping the first series. This coursing is continued until the neck end is reached. It is customary to rotate the cylinder clock-wise. The one-two-three and a pause, one-two-three, pause, sound emanating from the hammer is quite typical of the high as well as the low coursing process.

Figure 3, Plate 18, shows the second maple stake used to complete the contraction of the metal body. A cross-section of this stake will approximate a section similar to the final vase form taken at a corresponding position. Rather than force the metal unduly, it is better to reduce or contract the body by repeated coursings from middle to end as a much better shape is maintained by slowly bringing about the reduction. If splits appear or the joint opens, bring the edges together and solder.

The third hard-maple stake shown in Figure 4, Plate 18, is used to draw in the bottom of the vase, while a slightly hollowed piece of hard maple is utilized to flare out the neck with strokes from a horn mallet. Figure 6, Plate 18, is of the completed form ready for the base plate which is cut a trifle larger, soldered, and filed to conform with existing contours.

On the market will be found metal stakes for accomplishing practically the same results as the hard maple forms, but for many reasons the hand made stakes are to be preferred for britannia. The metal is kept softer and in a more workable condition; the hard maple is smooth and even on its contact surfaces; and the stake is less likely to mar the britannia.

Occasionally dents will cause annoying defects in the ware. The snarling iron of Figure 7, Plate 2, will quickly eradicate them. This stake is a long springy bar of metal with a rounding polished anvil head. Attach the snarling iron to the vise, press the head directly below the dent, and with a ball-and-pein hammer strike the snarling iron a sharp blow; the rebound will readily press out the blemish.

Illustration 3, page 14, of a water pitcher, shows the use of the lapped seam for vertical extension or high raising, an easy and valuable device for terminating curvilinear forms. Its concavity is produced by beating down on stakes similar to those illustrated in Plate 18.

"It is no sin for the artist to borrow from the past, provided he return the principal with the interest."—Ruskin.

Chapter X

CASTING AND TURNING APPENDAGES

THE training of the pewter craftsman was a long and arduous one—six years of apprenticeship! An additional year was demanded in which the accepted craftsman was supposed to reimburse his master for expenses accrued during his probationary period. Furthermore, and as a sort of thesis, he was required to make certain ware under exacting conditions which varied from time to time.

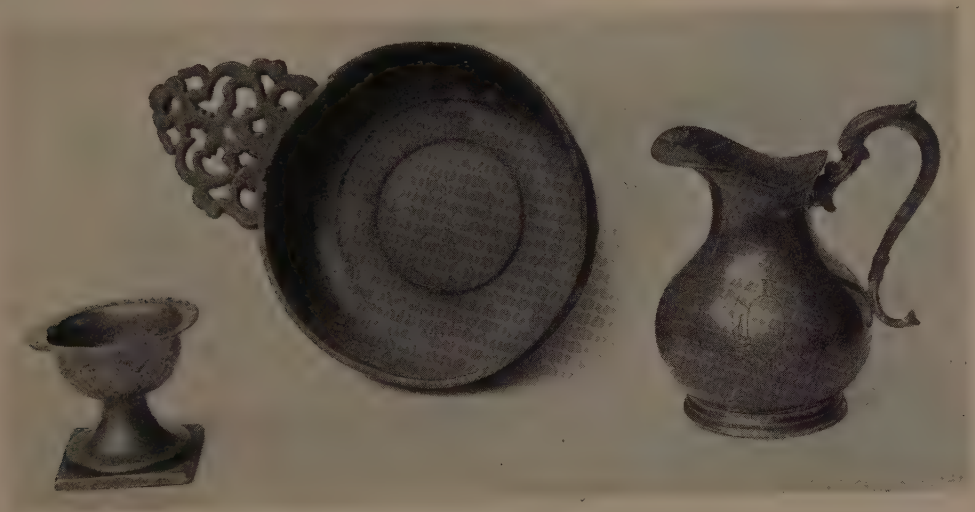


Illustration 33. American Colonial Pewter Porringer, Individual Salt, and Cream Pitcher. *(Courtesy of the Wisconsin Historical Museum, Madison.)*

Among the bits of drudgery of his apprentice days, turnwheeling must have provided the climax, inasmuch as the apprentice acted as a human motor, turning a large wheel belted to the pewterer's lathe, a primitive affair with its head and tail-stock, and a mandrel for the ware. Simple as was its construction, the lathe played an important but not highly respected part in perfecting the designs of the period.

As has been explained, mould making, casting, and turning entered into so much of the old ware that these cannot well be omitted from serious consideration. Moulds were formed from a large range of material—gun-metal appearing most common, followed by sand, lithographic stone, plaster of Paris, and even wood. These moulds were prepared for casting by a coating of white of egg, mixed with red ochre, finely powdered pumice stone, and other mixtures, tending to check striation or furrows in the metal.

HISTORIC DATA FOR DESIGNS
PEWTER SILVER SHEFFIELD·
DESIGN EMPHASIS ON PROPORTIONS AND CONTOURS: CONSTRUCTION BASED ON BENDING BEATING DOWN · RAISING: PROBLEM EMPHASIS · CASTING AND TURNING
SAUCE BOAT
SHEFFIELD PLATE - ENGLISH 1785
SWEETS DISH HOLDER WITH GLASS DISH - ENGLISH 1810
SMALL TUREEN FOR SOUP
ENGLISH 1790 (MODIFIED)
ELLIPTICAL TOBACCO JAR OR TEA CADDY - AMERICAN COLONIAL
PEWTER MUG 5½" HIGH
18th CENTURY ENGLISH
TYPICAL LATE 18th CENTURY ENGLISH MUG (MODIFIED)
NEW ENGLAND BEAKER
IONIC BASE MOULDINGS
BASES FOR AMERICAN COLONIAL SILVER PLATE "AMERICAN SILVER" AVERY
CORINTHIAN BASE MOULDINGS
IONIC AND CORINTHIAN GREEK MOULDINGS COMPARED WITH COLONIAL BASES OF XVII AND XVIII CENTS.
W·H·V·

Plate 19. Designs for Cast Appendages.

Whenever possible, the ware, such as spoons and forks, was cast in one piece (Illustration 8, page 19), while the larger articles were cast in sections and then built up by soldering. A tankard, for example, would be cast in three parts—one for the base, a second for the barrel, while the third mould formed the handle. Frequently a hollow handle was cast in halves and then soldered together. In exquisite finish, these moulds were comparable with the dies of the present day.

Designs for Casting and Turning Supports

The design sheet of this chapter, Plate 19, is planned to stress casting and turning. In the study of this plate, one decides at a glance that the cast portions of each problem (bases, handles, and knobs), are marked by distinct *delicacy of line* and *fineness of tempo*—characteristics directly to be attributed to the possibilities inherent in casting and in lathe technic. Contrasting with this delicacy, one notes the *robust curves* of the main masses of the designs, barrels, bowls, and the like,—all products, at least for school purposes, of the beating-down, bending, or raising processes. These two points of comparison illustrate perfectly the strong influence on design exercised by *tools and tool processes.*

In the bases shown in Plate 19, delicacy of line is attained by means of contours derived from architectural mouldings, perfectly fitted to pewter design, wherein sculpturesque ornament is inappropriate to the material. In the lower part of the plate, architectural curves used by the Greeks in Ionic and Corinthian columnar design are depicted. Compare these with bases selected from American Colonial cups and tankards. One may readily recognize the design knowledge displayed by these craftsmen-designers who understood their classic motives and used the Greek curves with impeccable taste, in the order in which they occurred in the originals. The cymas, beads, fillets, cavettos, and so on, are all there, arranged in rhythmic order. The same spirit is manifested throughout the examples

Illustration 34. American Colonial Pewter. Ladle and Miscellaneous Objects. *(Courtesy of the Wisconsin Historical Museum.)*

Illustration 35. Sugar Bowl and Creamer with Cast Handles.

chosen, Greek curves modified by other races and peoples, to their individual needs.

Aesthetically, these mouldings give *bands of light and shade*, varying in widths and intensities of light and dark, supplying superb transitions from the base or supporting member to the body.

HANDLES

Both bases and handles are classed as appendages and must be bound in harmonious relationship to the main mass. The sauce boat in Plate 19, with its free and swinging curves demands a similar handle as does the candy dish. The Eighteenth Century Pewter mug of English design with its robust curves has a fittingly synchronized handle, while the delicate mouldings of the base give balance by variety. The late Eighteenth Century English mug, simpler in line, demands and has corresponding handle design. Illustrations 35 and 38 show student work in casting, while Illustrations 37 and 39 are from historic sources.

Illustration 36. Nineteenth Century American Silver Tankard With Turned Base.
(Courtesy of the Boston Museum of Fine Arts.)

Appendage Design Rules

The appendage should be designed in unity, and proportionately related to, the vertical or horizontal character of the main mass to which it is attached.

The appendage should have the appearance of flowing smoothly, and if possible, tangentially from the primary mass or, contrasting with this arrangement, leave at a near or actual right angle.

If possible, the appendage should echo or repeat some lines similar in character and direction to those of the main mass. Chapter II will direct the reader into appropriate design practice.

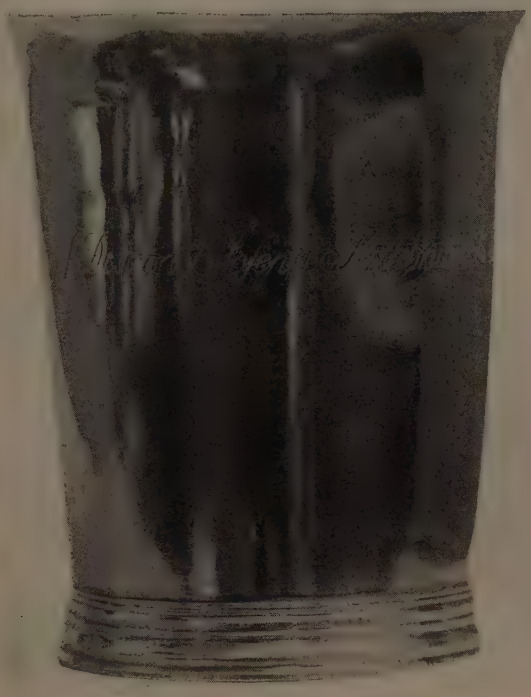


Illustration 37. Colonial Silver Beaker With Turned Base.

The Problem and Its Construction

The question of casting and turning will be divided into two parts; (1) involving casting and finishing, (2) casting and turning to be described in the following chapter. As a constructive problem, the handle of the late Eighteenth Century English mug of Plate 19, has been chosen. For its mold, plaster of Paris will be used. From the perspective of the craftsman of the middle ages, plaster failed to possess the essence of mould durability; it was not a material from which

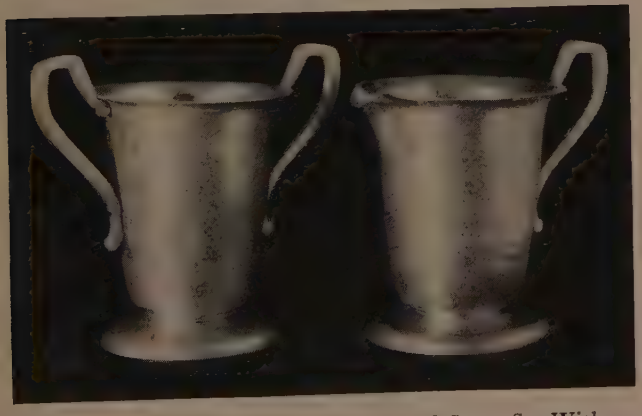


Illustration 38. Planished Cream and Sugar Set With Cast Handles.

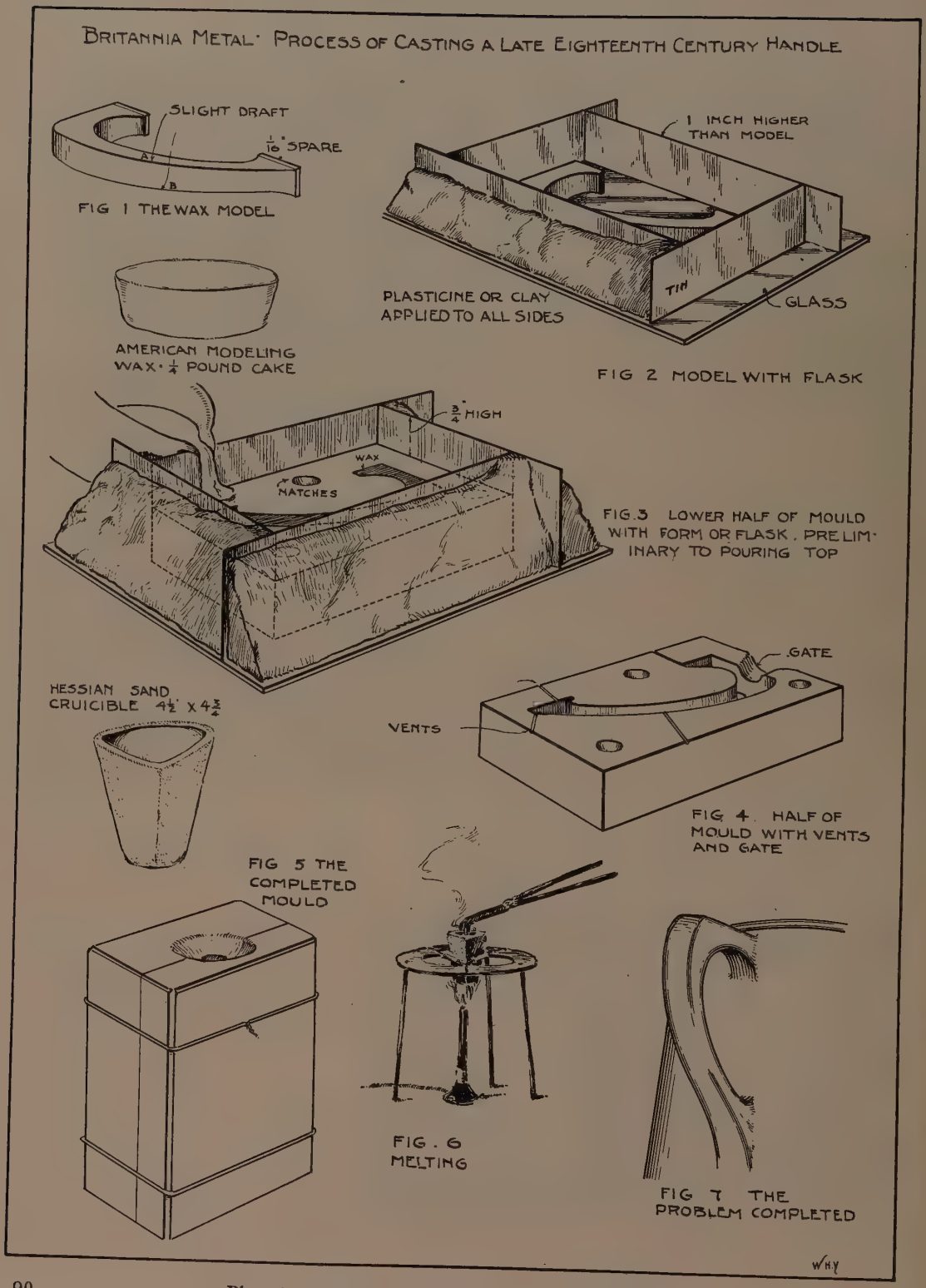


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Plate 20. Steps in the Process of Casting a Handle.

hundreds of castings might be produced. Since duplication tends to cheapen and destroy art, plaster moulds are admirable for school use, for they will live their limited span of existence and then depart to be replaced by new—and it is to be trusted—better ones.

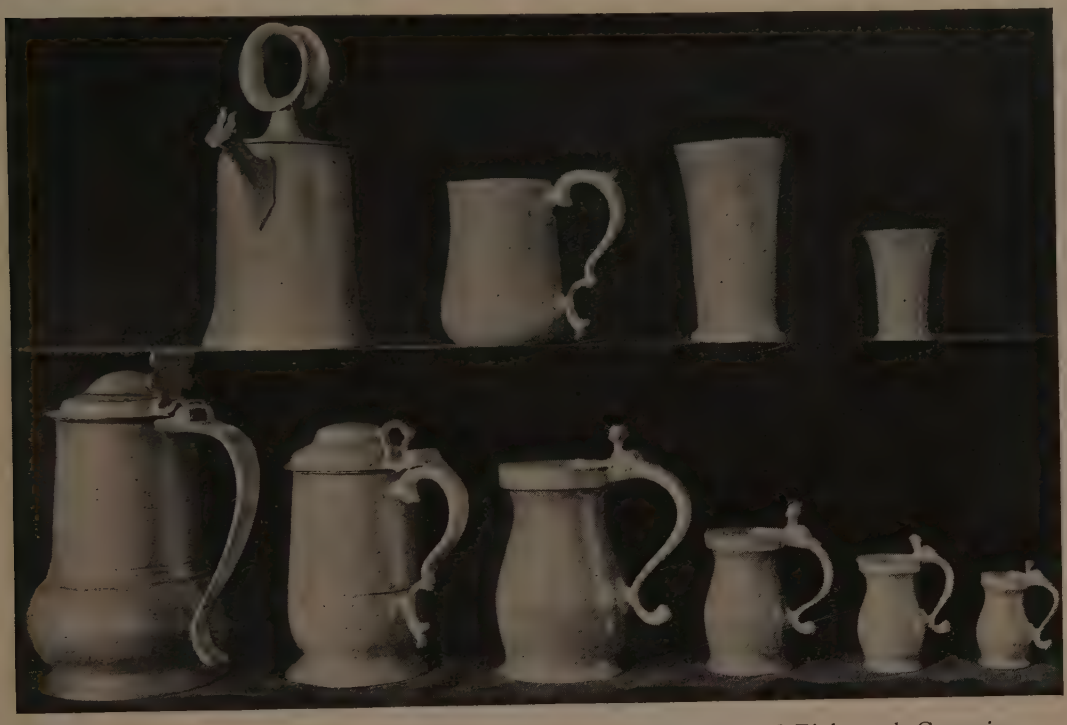


Illustration 39. Dutch and English Pewter of the Seventeenth and Eighteenth Centuries. *(In the Metropolitan Museum, New York.)*

The first step is to design a mug similar in spirit to the illustrated pattern, governed by the design rules herein suggested. Purchase one-half pound of modeling wax; immerse it in warm water to give plasticity; model it into a flat sheet slightly thicker than the handle, and trace the designed handle on it. Allow an additional one-sixteenth of an inch for filing and fitting at the junction joint with the barrel, and a slight amount, according to one's skill, for the final finishing. With a thin and slightly warm knife, cut out the pattern.

In order that the model and casting may withdraw smoothly from its mould, give a slight taper from surface A to surface B (Plate 20, Figure 1), carrying this taper or draft along all sides. If one so desires, the model may be cut from a plaster bat or sheet, from wood or from lead, but wax is simpler in that it needs no preparation to keep the plaster from adher-

ing. Plasticine can be used for the pattern, but does not possess the stiffness of modeling wax.

Figure 2, Plate 20, shows the model placed on a sheet of glass with the tapering edges upward, boxed in by thin strips of tin or cardboard held in place, and with the joints *securely sealed* by clay or plasticine. The latter is excellent in that it does not dry out and may be used repeatedly. It is imperative to leave at least one inch of clearance between the extreme points of the model and the walls of the mould and to cut the strips of tin one inch higher than the highest part of the pattern.

POURING THE MOULD

Superfine plaster of Paris, secured from any paint store, is sifted slowly into a bowl of water until the plaster begins to appear above the surface of the water at all times, thus forming a state of saturation. With the hand or a wooden mixing ladle, stir the plaster to a creamy consistency, keeping the hands or ladle immersed at all times. This counteracts the tendency to introduce air bubbles which are produced by a vigorous beating of the mixture. Without losing time, pour the plaster slowly into the mould until it is filled. Give the table a few sharp jars with the hands; this will detach any air bubbles from the pattern and work them upward toward the surface.

In a short time, usually fifteen or twenty minutes, when the plaster feels warm and has set, remove the strips of tin and slide the mould gently from the glass. If the model has been well constructed and placed firmly on the glass, no plaster will be found on the lower side of the mould.

Remove any loose edges, fill in air bubbles with wet plaster, and cut the natches or joggles—hollow hemispheres made by revolving a dime in the still wet plaster. These joggles will be duplicated in relief in the mould top, supplying a guide for replacing that member.

PARTING MIXTURE

A preliminary treatment of the completed half mould is termed doping, a preventative to keep the top from adhering. Dope or parting mixture is made by boiling one pound of soft soap in one quart of water and stirring in one-quarter of a pound of Russian tallow, and a small lump of soda. Or it may be made by dissolving one pound of soft soap in one quart of water and stirring in one-quarter of a pint of paraffin oil. (Cox.) Several coats should be given until the mould feels waxy and its surface is saturated. Dry the mould, and rub with cotton waste, making a smooth, glossy surface. A final light coat of olive oil completes the process.

Figure 3 shows the doped mould with the wax model in position and ready for the pouring of the cover which for small projects should be at least three-fourths inch thick. After pouring, wait for the plaster to set, and with a thin knife blade separate the moulds, working from all sides gradually along the joint.

Remove the wax model and note the manner of its withdrawal. If small bits of the mould are pulled away, the draft or taper is faulty, or there are undercut surfaces. With a knife, correct these inaccuracies. Cut the pour hole, or gate, and with a pin point, draw lines across the mould for air vents, as in Figure 5, Plate 20. Take this opportunity to *dry the moulds thoroughly*, for they are dangerous if cast wet. Dust with powdered charcoal or fine pumice before casting.

CASTING

Sand crucibles are excellent for melting pewter, and may be purchased from any jewelry or dental supply house, or one may use a two inch lead melting ladle. A good melting device consisting of a bunsen burner, a ring stand, a clay triangle with the crucible handled by small crucible tongs, is sketched in Figure 6, Plate 20.

Fill the crucible or ladle with scrap britannia, raise to the melting point, and pour into the assembled and dried mould (Figure 5, Plate 20), which may be supported on a bed of cinders or coke. Pour steadily, as an interrupted stream may damage the casting. When cool, lift the casting carefully by the gate and by the metal left in the vents.

FINISHING

File into shape, using old pieces of leather belting for facing the jaws of the vise. The point between the barrel and the handle should be filed with a half-round single-cut file, while the rounding edges may be secured by the combined effects of both half-round and flat files. For corners which are hard to reach with coarse needle files, it is advisable to use die sinkers' or silversmiths' riffle files which may be purchased in many shapes. They are easily cleaned and are in many ways desirable. Polish thoroughly with fine emery cloth, followed by tripoli and the felt buff so that the handle gives a pleasant tactile reaction when gripped. Wire into position on the barrel, as directed in Chapter V, solder, remove the surplus material, or solder and supply the desired bright or dull finish.

While the mould about to be described is not simple for beginners in the art of casting, it has certain advantages connected with freeing from

the mould, handles cast to a round pattern. Support the handle, Figure 2, Plate 20, by inserting small stiff wire props in the model, raising it one inch above the glass plate. Pour the plaster until it is just half-way on the pattern; when set, pull out the wires and seal their holes; remove the handle gently and trim the mould to an even surface; reinsert the handle, dope, and repeat the steps shown in Figure 3, Plate 20. One-half of the

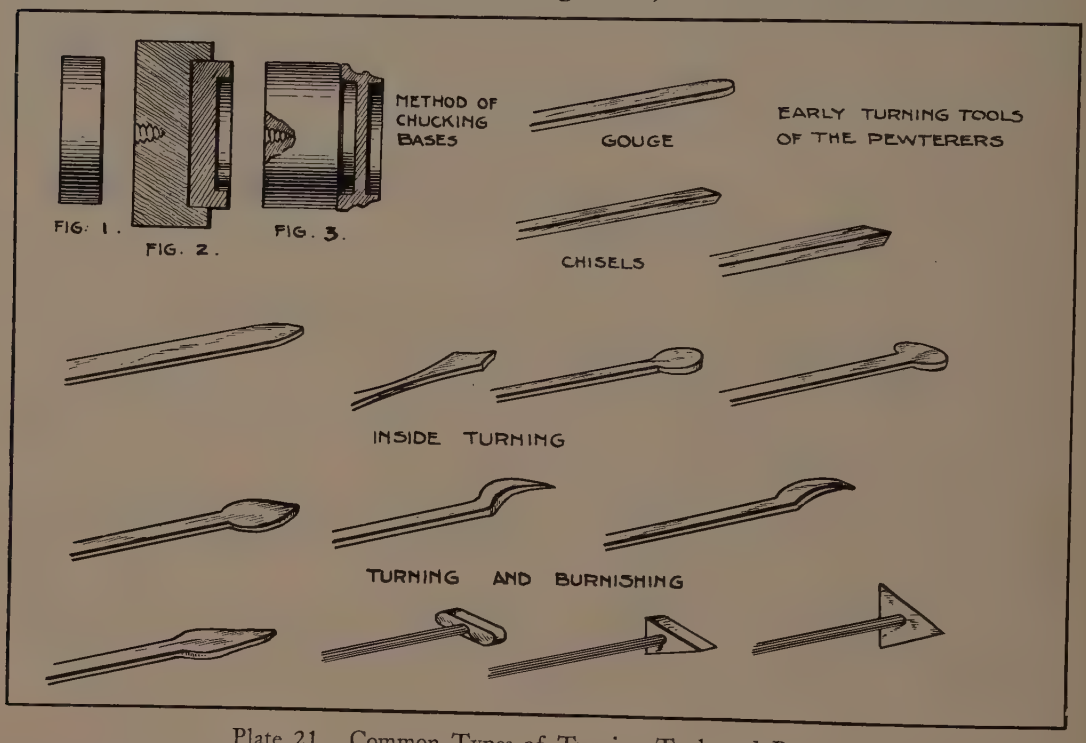


Plate 21. Common Types of Turning Tools and Bases.

handle is now in each half of the mould. In using this mould, the handle draft necessarily is from the center line of the handle outward toward the edges, permitting the casting and model to be withdrawn from each half of the mould.

While the practice just described gives the best results, frequently fair castings may be made by pouring pewter directly into the mould section of Figure 4, Plate 20, first closing the gate and the vents.

THE TOOLS

Five hundred years have made little difference in the shapes of the turning tools used by the ancient pewterers. In Plate 21, the more common types are illustrated.[1] Many of these are similar to the current wood turning tools. The burnishers of steel, with the highest possible polish, are

[1] "Pewter Plate" by H. J. L. J. Masse.

for imparting the smooth finish to turned surfaces. All of the tools may be made from tool steel, while as the emergency arises, more tools may be added to the collection. Brass turning tools serve as desirable substitutes.

Scraping cuts are in bad form for wood turning, but are allowable and customary in britannia technic. Certain tools are used for both turning and burnishing, as in the case of the first one in the bottom row, which is termed spear-grater or burnisher, according to its use. The remaining three tools or hooks in the bottom row are used in a manner peculiar to themselves, namely, by holding them under the tool rest and thus against the lower side of the rotating metal. As is normally the case, the other turning tools are placed above the rest. Old pewterers' tools had abnormally long handles with which sufficient pressure for burnishing could be applied.

A low speed becomes necessary in turning and burnishing pewter. As the heat generated by the burnishing process causes the britannia to adhere to the tool, it becomes necessary to lubricate the work with soap and water.

Turning Pedestals and Bases

The duplicating of bases and knobs required for the containers illustrated in this chapter involves both casting and turning. In the direction of *practicable school methods*, it is best to solder handles, bases and knobs to the bodies of the problems.

For forming the bases of the problems shown in this chapter, cast a cylindrical blank, exceeding slightly the greatest diameter of the desired part. (Figure 1, Plate 21.) Attach a piece of wood to a screw face plate, true into cylindrical form, and cup out the outer end into which the metal blank is forced. With the gouge and chisels, hollow out the base of the pewter blank, and true the bottom (Figure 2, Plate 21). Remove the base and turn the same piece of wood down to the diameter at which it may be tightly fitted into the hollow in the base. (Figure 3, Plate 21.) Complete the contours, and recess the top of the base as illustrated, into which may be fitted and soldered the metal cup or other form.

It should be kept in mind that a large amount of delicate design is concentrated in a small space in this base. As the lines and character of the base change, many variations of this simple chucking plan will suggest themselves.

"Also, that no one of said craft, great or small, shall be so daring as to receive any workman of the craft . . . if he be not a good workman and one who can have the testimony of his masters."—From Ordinances of the Pewterers, A. D. 1348.

Chapter XI

THE CANDLE-STICK—ITS HISTORY AND DESIGN

ITS HISTORIC SIGNIFICANCE

"THE Butcher, the Baker, the Candle-stick Maker," runs the old rhyme. The candle in some form is as old as civilization, and the story of its evolution is full of interest. The origin of the first primitive candle is vague. Biblical history brings to us knowledge of the skill of metal workers of that day—the superb seven-branched candelabrum of the Temple of Jerusalem, and the oil-fed golden lamps,—but little is written of the candle as we know it.

The torch-like lamps or candles of the Romans and Greeks have supplied our symbol of knowledge, but the first information of the true candles comes from the Third Century after Christ, when, as a valuable accessory to church services, its gleam lent impressiveness and solemnity to the ceremonies.

Candlemas Day, a religious institution first mentioned in documents of the Fifth Century, is accredited with the introduction of the candle and stick. This festival, in commemoration of the presentation of Christ in the Temple, was celebrated by a procession of the clergy who blessed and distributed candles as symbolic of the light of Christ.

"On Candlemas Day
Throw candle and candle-stick away."

This referred to the custom of discarding old and using the newly blessed candles for the ensuing year; which would seem costly except for the following reason. The word "candle-stick" gives us a key to it as the early forms in use at that time actually consisted of wooden sticks upon the point of which the people impaled candles, making the custom an inexpensive form of devotion.

With the growth in magnificence of church services, it is easy to see how metal candle-sticks naturally would displace these simple wooden affairs. The design of succeeding metal candle-sticks was simple—a column or shaft surmounted by a *pricket*, or sharp point, for retaining the tallow candle and a saucer around the shaft for the drip.

English religious persecution which culminated in the Sixteenth Century by the abolition of Candlemas Day naturally curtailed the use of candles. Furthermore, superstition attached to the old pricket candle-stick

hastened the introduction of a new form, similar to modern patterns. This late Sixteenth Century pattern was similar to our candle-sticks in that it had a socket for the candle, a short, fluted column with a square base, provided with a circular depression or a circular plate, to protect the hand from hot drippings.

The first illustration in Plate 22 represents a modification of this type, as expressed by a Jacobean pattern of the early Seventeenth Century. With its simplicity of construction, severity of form, heavy proportions, and straight lines, it harmonizes completely with the furniture of the period.

Through the Dutch predilections and tastes of William II and Mary, a complete change of spirit, more or less suggesting the turned legs and fluting of the furniture of the time, is found. The second design in Plate 22 pertains to silver, and its design would need considerable simplification in its transmutation to pewter. To understand this, study the pattern of 1698 and a later pewter translation in the lower left hand corner. The William-and-Mary spirit remains the same, but details and curves show considerable modification.

At the beginning of the Eighteenth Century, and with the advent of the Queen Anne style, simple and plain designs became the fashion, with practically no surface enrichment. A distinct departure from previous forms came through the introduction of the baluster shape in the shaft or stem. The baluster shape, also seen in the broad splats of the chairs of the period, is shown in the graceful swelling or enlargement of the stem, as in Plate 22. The bases of the Queen Anne style were usually square, with the corners cut off, giving a semblance of an octagon, the whole presenting a finely proportioned and subtly curved design. It is interesting to associate Walpole, Pope, Addison, and the artists Reynolds and Hogarth with this period, to imagine them as living and working under the rays of candles, placed in sticks of similar Queen Anne patterns.

Unhappily for simplicity, designers soon began to add scrolls, flowers, and other Louis XV devices to the sticks, designs became heavier, and much of the simple beauty was lost. Our illustration, the first in the middle row of Plate 22, shows a transitional type wherein the William-and-Mary influences (which lasted through the reign of Queen Anne) served as the underlying form for over-decoration which has been omitted from the illustration. Some patterns of this transitional period were plain, with square bases and round corners, but the highly decorated styles were usually provided with round bases, as is shown in the cut.

Plate 22. Examples of Historic Candlesticks.

Near the middle of the Eighteenth Century, revival of interest in the classics led to the introduction of the fluted Corinthian column as a motif in candle-stick design, illustrated in Plate 22. Towards the latter part of this century, further development of the classic idea replaced the Corinthian column by a square stem, tapering towards the base and terminating in the urn-shaped socket depicted in the Adam candle-stick. Festoons of vines and leaves formed surface enrichment, much to the detriment of an attractively designed contour. The same types of surface motives, but more appropriately applied, are to be found in the contemporary Adam furniture of the period and in the pottery products of Josiah Wedgwood. Curiously enough, for the first time, we find removable candle sockets introduced in this epoch. Contemporary pewterers followed closely the designs of the silversmiths, their best designs showing true translations of silver motives into lines fitting the softer pewter.

Candle-stick design of the Nineteenth Century repeated with slight variations, the styles mentioned. American silver and pewter followed contemporaneous English styles, as will be seen by reference to the two remaining cuts in Plate 22. The middle illustration in the last row is permeated with William-and-Mary influences in its shaft, with classical tendencies in the modeling of the base and socket. The last one has the baluster pattern of the Queen Anne style; it likewise possesses classical traits of the previous century with relation to the mouldings, and eclectic blendings which seem to lend a peculiar beauty to American Colonial pewter.

Designing the Problem

In designing a candle-stick, it is well to bear in mind the parallelism between an architectural column and the stick in which pedestal, shaft, and socket follow closely the constructive design of the cap, column, and base of the classic form. As in architecture, the problem resolves itself into questions of (1) proportions and (2) coordination of the pedestal, shaft, and socket by delicately graded curves or contours.

The designer should avoid the fault common to many old candlesticks, in which an over-heavy base resulted in clumsy proportions. Possibly a desire to make the base sufficiently heavy for utility, led to the error. The lower row of designs in Plate 22 and the styles in Plate 23 will give an idea of relative proportions which have proved satisfactory. The reader is referred to Chapter III for detailed design data.

Contour curves function to unite the horizontal planes of the base with the vertical spirit of the column, later to join the column and socket.

The feeble effect of two compass curves used to join base and shaft, an error common to modern school and ancient practice, must be avoided in favor of more subtle curvature and far deeper mouldings with their varying shadows, for it is by these shadows that the candle-stick stands revealed and its beauty is made visible.

To join the pedestal and shaft, two methods may be used—long curves in contrasting directions (Eighteenth Century designs in Plates 22 and 23), or a series of smaller curves representing both continuity and contrast, as depicted by the last candle-stick in Plate 22.

The shaft may be either plain or curved, provided the curves are so grouped as to show one dominant or major curve supplying character to the design. The minor curves are to be planned so as to give either marked contrast and deep shadows or to be in complete continuity of curvature; moreover the curves must be adjusted to the hand. The stick is usually

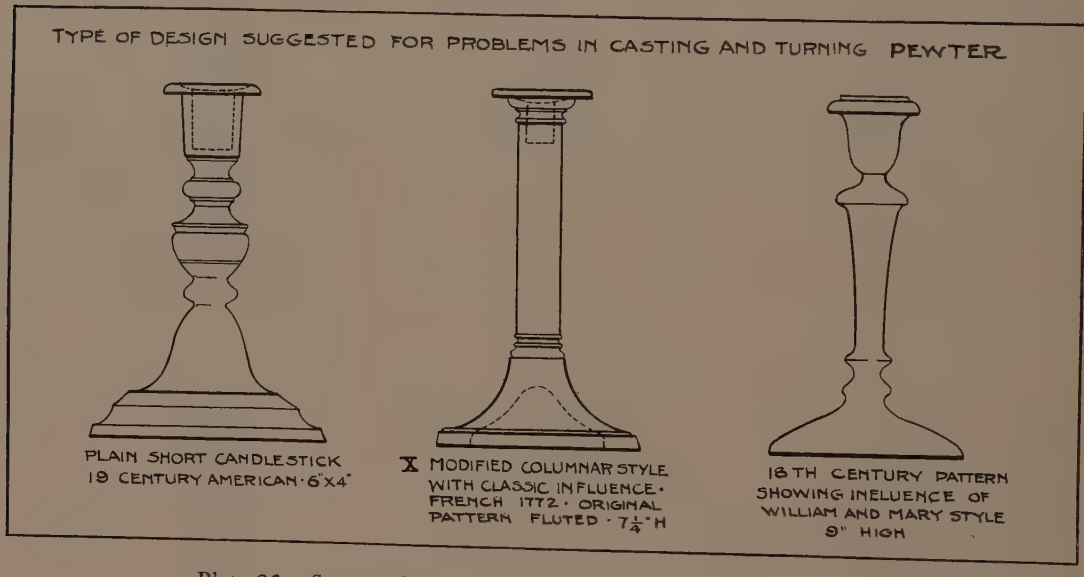

TYPE OF DESIGN SUGGESTED FOR PROBLEMS IN CASTING AND TURNING PEWTER
PLAIN SHORT CANDLESTICK
19 CENTURY AMERICAN · 6"X4"
X MODIFIED COLUMNAR STYLE
WITH CLASSIC INFLUENCE ·
FRENCH 1772 · ORIGINAL
PATTERN FLUTED · 7¼" H
18TH CENTURY PATTERN
SHOWING INFLUENCE OF
WILLIAM AND MARY STYLE
9" HIGH

Plate 23. Suggested Designs for Casting and Turning Problems.

gripped by its shaft, but upon occasion this is varied, as in the short candle-stick of Plate 23, wherein the hand rests on the long curve of the base. Usually there is a deep shadow directly under the socket, with a series of smaller curves varying the shadow and supplying an interesting connection between shaft and socket. The Doric column may be studied with advantage, for its moulds are quite appropriate to pewter designing.

Unity of design is emphasized by a repetition of similar curves, retaining in mind the precept of pewter design—robustness plus delicacy. While in this book, the need of lucid explanations calls for the development of an arbitrary design, it is clear that exact copying of the pattern suggested is a valueless pursuit and out of sympathy with the art-crafts movement. To avoid the need of direct duplication, there have been supplied sufficient illustrative material and design methods from which may be created individual motives in the spirit of the school which appeals to the worker.

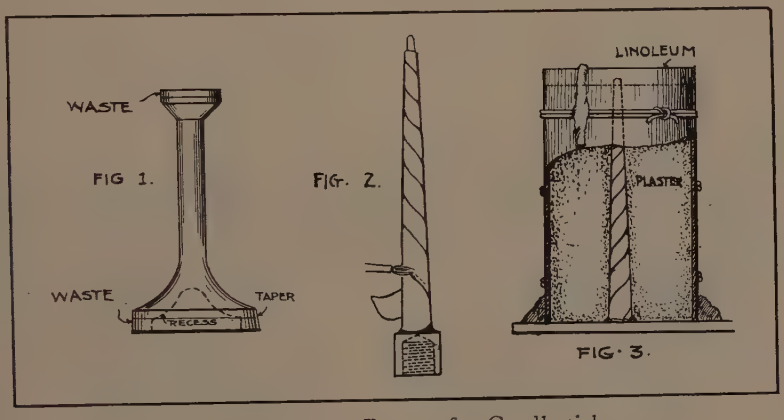


Illustration 40. Pattern for Candlestick.

For our problem, it is wise to choose one of the simplest, the modified French columnar design in the center of the top row in Plate 23. This is based on the 1772 Corinthian column pattern (Plate 22) from which the objectionable features of fine detail and flutings have been removed.

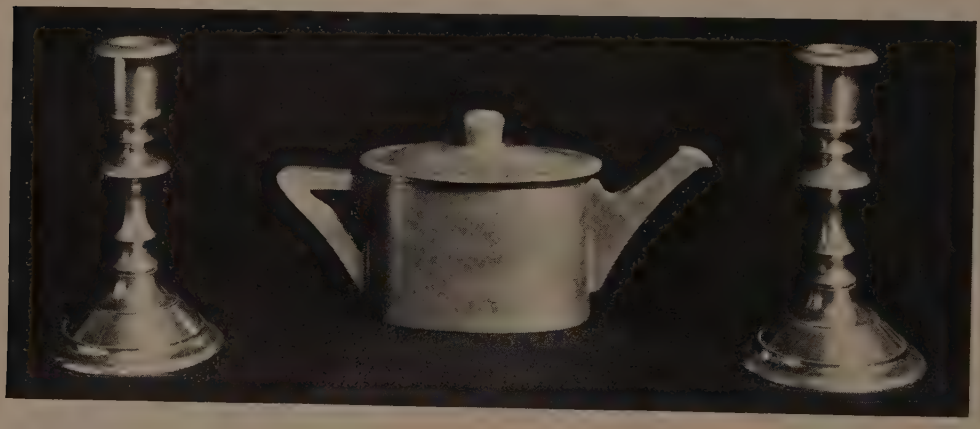
PREPARING THE CANDLE-STICK PATTERN

The construction of this candle-stick calls for the preparation of a simplified pattern, represented in Figure 1, Illustration 40. Allow one-fourth of an inch at all points for turning, three-eighths of an inch at the bottom, and one-fourth of an inch at the top for waste. This pattern may be made of wood, but preferably of plaster which turns perfectly.

The best method is as follows: Prepare a tapering steel mandrel, Figure 2, Illustration 40, with one end threaded to fit the head stock of a wood turning lathe and two inches longer than the candle-stick pattern. Wrap stiff paper around the mandrel, and glue its overlapping edges, producing a tapering tube which, when dry, may be slipped from the mandrel.

Wrap linoleum into a cylindrical form slightly exceeding the external diameter of the pattern, and by means of clay or plasticene, seal it to a flat surface of tin or glass, Figure 3, Illustration 40. Place the tapering paper tube in the exact center of the linoleum roll, fasten with a bit of clay, and cast a plaster cylinder as directed in Chapter X. When the plaster is set, remove it from the linoleum and slip it on to the tapering steel mandrel, upon which it may be turned with the usual lathe tools or with the pewterers' outfit. A well-shellaced tapering hardwood stick, sufficiently long to be held between head and tail stock, may be substituted for the mandrel.

When turning, allow sufficient space between the pattern and the head stock for the entrance of a tool to recess the base for chucking, as seen by the dotted line in Figure 1, Illustration 40.



Cast and Turned Colonial Candle-Sticks.
(Courtesy Holt Metal Company.)

Chapter XII

ADVANCED MOULD CONSTRUCTION AND CASTING

PEWTER came into use when the economic conditions of the people demanded a metal for purely utilitarian purposes and at a minimum cost. When conditions of this nature are in evidence, simplicity of enrichment and true service must be present in each article made, a spirit which should be maintained throughout.

While it is true that the age of complete dependence upon candle-sticks and candles has been passed, yet is it not felt that something of the simplicity of early times—the atmosphere of our forefathers—comes back to us in the subdued gleam of the candle-light? Every hostess knows the aesthetic reactions of candle-light upon her dinner guests. And what could add more to this picture than the dull sheen of britannia candle-sticks? When not in actual use, candle-sticks of good design and in harmony with the furnishings, add effective accents to the living room or sideboard. In many summer cottages, the candle-stick is indispensable.

In the use of metal, historical precedent is followed; moreover there is a sense of solidity, permanence, and utility inherent in a metal candle-stick, which is partly lost in the prevalent use of wood.

MOULD CONSTRUCTION

In the construction of the mould for the columnar candle-stick begun in Chapter XI, the model or pattern is constructed and slipped free from its tapering wood or steel mandrel. Our first task is to divide the pattern equally into halves by drawing light pencil lines exactly in the center, by the method shown in Figure 1, Plate 24.

The present construction calls for a three-piece mould, involving new problems. A box or flask is to be constructed of one-fourth inch wood or tin, exactly enclosing the ends of the pattern, but clearing it on the sides by about one inch. The form is joined at the corners by the method explained in Chapter X, page 92.

Placing the flask on a strip of tin, fill the lower part with clay or plasticene and imbed the pattern in it exactly to the center line on each side, leaving about one inch between the lower part of the model and the bed upon which it stands. An equal space must be allowed between the model and the sides, as may be seen in Figure 3, Plate 24. Revolve a dime in the

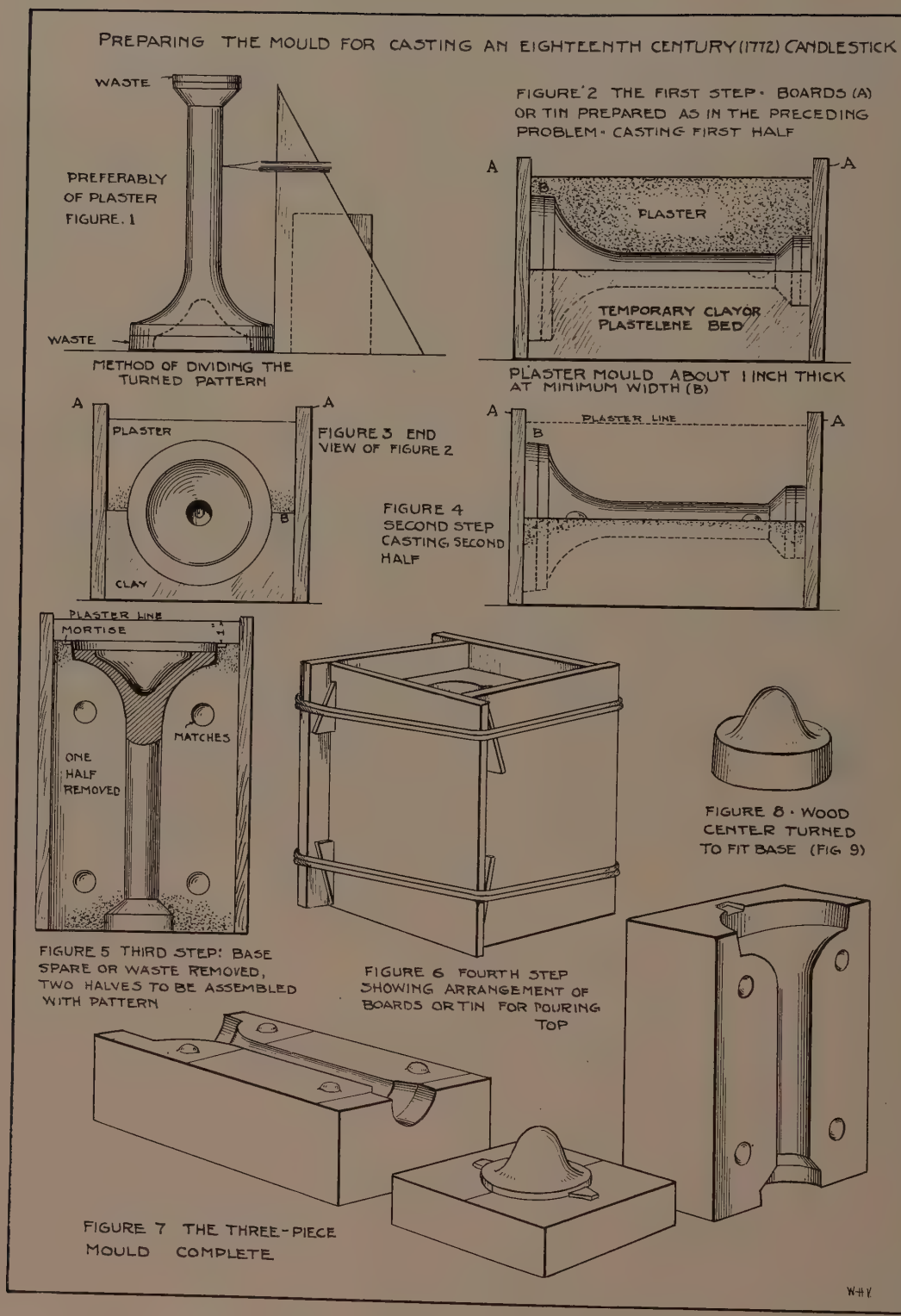

PREPARING THE MOULD FOR CASTING AN EIGHTEENTH CENTURY (1772) CANDLESTICK
WASTE
PREFERABLY OF PLASTER FIGURE. 1
WASTE
METHOD OF DIVIDING THE TURNED PATTERN
FIGURE 2 THE FIRST STEP. BOARDS (A) OR TIN PREPARED AS IN THE PRECEDING PROBLEM. CASTING FIRST HALF
A
A
B
PLASTER
TEMPORARY CLAYOR PLASTELENE BED
PLASTER MOULD ABOUT 1 INCH THICK AT MINIMUM WIDTH (B)
A
A
PLASTER
B
CLAY
FIGURE 3 END VIEW OF FIGURE 2
A
PLASTER LINE
B
A
FIGURE 4 SECOND STEP CASTING, SECOND HALF
PLASTER LINE
MORTISE
MATCHES
ONE HALF REMOVED
FIGURE 5 THIRD STEP: BASE SPARE OR WASTE REMOVED, TWO HALVES TO BE ASSEMBLED WITH PATTERN
FIGURE 6 FOURTH STEP SHOWING ARRANGEMENT OF BOARDS OR TIN FOR POURING TOP
FIGURE 8. WOOD CENTER TURNED TO FIT BASE (FIG. 9)
FIGURE 7 THE THREE-PIECE MOULD COMPLETE
WHY

Plate 24. Steps in Advanced Mould Construction and Casting.

clay bed to form natches, two of which on either side will be sufficient. Coat the pattern with parting mixture, as well as the flask, and pour the plaster steadily into the form, until it reaches a point about one inch above the highest point of the pattern. Gentle tapping of the table top will help to free the plaster from air bubbles.

When the plaster is set, remove the pattern from its clay investment and, working slowly and carefully, free it from its mould. If the mould has been poured to a point exactly on the center line of the pattern and the pattern previously well coated with the parting mixture, permanent adhesions to the mould will not occur. As a precautionary step, it is well to wipe the pattern with sweet oil after doping and preparatory to casting, using care to remove all surplus oil.

Again doping the model, replace it within the mould just completed, Figure 4, Plate 24, which likewise should be well coated with a parting mixture; re-assemble within the flask and pour the upper half of the mould. After the mould has set, use an old kitchen case knife or a small wooden wedge with which to separate the halves.

At this point, replace the pattern on its taper mandrel and turn off the spare material or waste on the base end, remove it from the mandrel, stop up or fill the spindle hole with clay or a similar substance, and with a scraper or chisel, cut the mortises, one of which is illustrated in the half-mould of Figure 7.

The last and third step calls for the assembling of the pattern's two sections, enclosing the same by thin boards or tin as depicted by the partial section of Figure 5 and the perspective of Figure 6, Plate 24. Binding the whole together, increase the tightness of all joints by inserting wooden wedges, as located in Figure 6, Plate 24. After doping all surfaces to be brought into contact with the remaining section of the mould, pour the plaster to a thickness of one inch, and after it has set, separate with wooden wedges, trim superfluous edges and the three-piece mould with notches and mortises ready for assembling, stands completed (Figure 7).

Preliminary to casting, take a small, sharp tool and draw a number of air vents, indicated by the single lines of Figure 7, Plate 24, and dry out the mould so that all presence of moisture is removed. There is *grave danger of an explosion* if this latter provision is not followed explicitly. For casting, one should purchase a fairly large wrought steel melting ladle—one holding one and three-fourths pounds will contain enough britannia for most candle-sticks. Powder the mould with finely ground char-

coal, melt No. 2 britannia, and pour a steady stream into the closely bound mould which may be slightly warm for the best results.

For final lathe turning, form a hardwood center to fit tightly into the base of the casting, Figure 8, Plate 24. Attach this to a screw face plate, countersink the socket end for the dead center, and proceed to turn the mouldings. Use a thin cardboard or tin template for a guide, until the eye has become so trained that the curves of the design may be rendered with precision, marking off only the larger divisions with the dividers. By depending upon the eye for curvature, much more satisfactory curves are produced with a truer spirit of the original design.

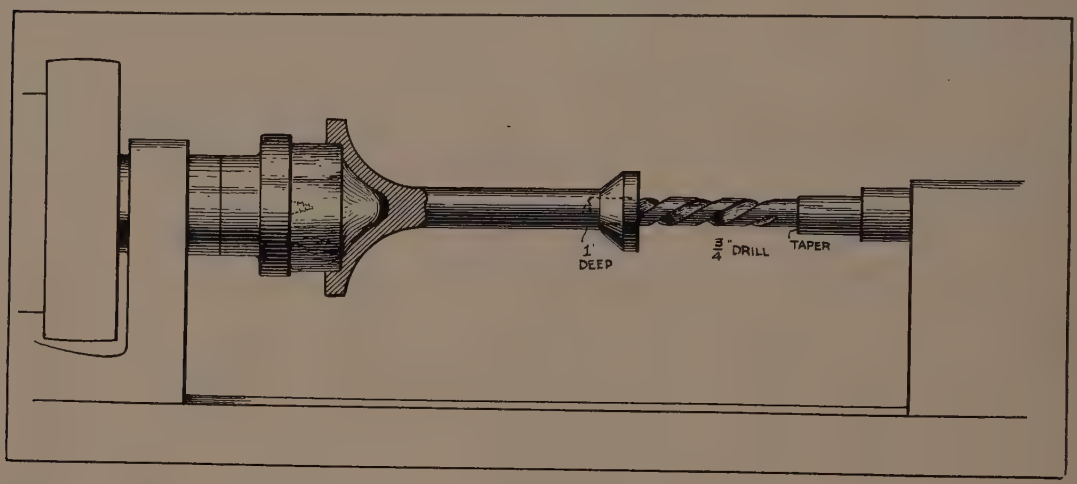


Illustration 41. Method of Chucking and Drilling Candlestick.

In order to retain the candle in position, the process described in the preceding paragraph needs the addition of a cylindrical attachment soldered to the socket, within which the candle may be secured—an element to be considered in the initial design. The holder may be varied in shape and thus secure accord with the general design of the shaft and base. The average size for the candle is a socket seven-eighths of an inch in diameter at the top and tapering to three-fourths of an inch diameter at the bottom, with a depth of one inch.

By soldering, the addition of the socket is a simple form of construction, but it is not typical of old time processes. In these, emphasis was placed on one-piece construction, demanding a candle-socket hollowed out from the original casting. There are many advantages in this one-piece construction, but the process is more difficult.

Briefly, the process is summarized in Illustration 41. Use the wooden center of the simpler process, substituting a three-fourths inch drill with a taper shank for the dead center of the lathe. After lubricating freely with soap and water, rotate the lathe at slow speed or by hand, and drill to the depth of one inch. With a reamer, taper the hole with a maximum diameter of seven-eighths of an inch at its top. To avoid the danger of twisting the socket from the shaft, drill before turning. If the drill cuts too fast, reduce its cutting angle.

Before turning, shape a small wooden center to fit the candle-socket just completed; this will serve as support for the dead center. A saucer-like depression on the top face of the socket will act as a drip retainer. After turning, the candle-stick should be burnished to a bright, even surface, and afterwards dulled with fine pumice stone and oil.

As the designer-craftsman progresses in proficiency with casting, the original *pattern* may be turned still nearer to the desired shape, leaving a comparatively small amount of metal to turn down before the final shape is reached. Candle-sticks with square bases or shafts may be moulded with one diagonal of the base in a horizontal plane. This allows the pattern to be freed from the mould with greater ease, afterwards finishing the casting with half-round or other files, and completing the process with the tripoli buff, fine emery cloth, and oil.

In closing the subject of candle-sticks, an old custom of auctioning "by the inch" is interesting. Upon the occasion of sales, a small stub of candle was lighted and placed in the stick. While the candle burned, the bids mounted higher and higher. The last bidder before the flame expired became the purchaser of the stick.

Chapter XIII

SURFACE ENRICHMENT OF PEWTER

"AND also, the good folks of the craft have agreed that no one shall be so daring as to work at night upon articles of pewter, seeing that they have regard among themselves to the fact that the light is not so profitable by night or so certain as by day,—to the common profit."—From Ordinances of the Pewterers, A. D. 1348.

Obviously, this regulation, quoted from the Ordinances of the Pewterers, was intended to foster a genuine spirit for honest workmanship and highest attainments within the ranks of the Guild of Pewterers, and severe penalties were attached to this and other similar regulations. If a workman violated certain rules three times, the pewterers cast him out of the trade: "He shall be fornized of the craft forevermore."

In addition to their high standards, these old pewterers must have been hard workers, for in the ancient "statutes of the streets against annoyances," it was enjoined that "no hammerman, as a smith, a pewterer, a founder, and all artificers making great sound, shall work after the hour of nine at night, nor afore the hour of four in the morning, under pain of three shil., foure pence." At that time this was a large price for untimely diligence.

When striving for real attainment of beauty in materials as well as in workmanship, it is of value to see the manner in which the pewterer treated the ornamentation of his work. Pewter was intended to withstand hard use, hence the pewterers understood a truth of modern design; namely, the less extraneous decoration, the more lasting the goods. Well designed, strictly utilitarian pewter and britannia should have its decorative emphasis centered in correctness of proportion, fineness, subtlety, or robustness of its contour curves, pleasing texture of the surface, and obvious adaptation to use. Whatever ornament is used must be closely related to the contours, almost architectural in its simplicity, with a distinct freedom from the highly modeled and sculpturesque treatment.

There is a natural integrity and honesty about nicely textured plain surfaces with a beauty of their own which cannot rashly be altered, a beauty one feels so clearly personified and symbolized in the creed of the old pewterers. We should treat our plain surfaces with marked respect, reducing them with emery and oil to an even, satin-like texture, pleasing to

the touch, or if warranted by the processes, with unaggressive tool marks. It seems a sacrilege to unmercifully hammer a good surface full of bumps with the sharp end of the ball-and-pein hammer under the guise of "tooling" that surface. The article resembles a case of virulent small pox.

The decoration of pewter had its beginning prior to the first part of the Fourteenth Century, by a band of independent craftsmen not concerned with the *design* and *production* of the original undecorated forms. These craftsmen failed to enter into the decorative spirit in which the metal should be treated.

Finally, the pewterers controlled all phases of their craft, the decoration showing a sense of fitness, a subordination to the form of the ware, and a sympathy, all of which accompany good design. While the processes about to be described are interesting, they do not have equally interesting aesthetic value.

One of the simplest forms of enrichment was carried out with a conically shaped tool, resembling a center punch, which was forced vertically into the metal in a series of dots. Frequently this took the form of an S curve for a border, Plate 25, 17a. This "pricked ornament" depended for its richness upon carved lines binding it into unity. Sometimes the pricker was supplanted by stamps of various shapes, occasionally flat on one side and serrated on the other. When stamped in a continuous series, this tool produced a border-like plan of enrichment.

Chasing—or as the French term it, *repousse*—was found on pewter, but the housewife's polishing mixtures of ashes or powdered brick had a way of destroying the highly modeled or relieved parts of the design. Moreover, deep grooves had a tendency to weaken the design, consequently *shallow* modeling in chased treatment controlled the motives of the best designers. Frequently the bases, lids, and even bodies of tankards and coffee pots were decorated with diagonal fluting. When one-third of the body is covered with vertical fluting, the effect is pleasing, as one can see in the cup of Illustration 42. This cup is of silver, but by imagining a simpler fluting necessary for pewter, one can readily picture the effect.

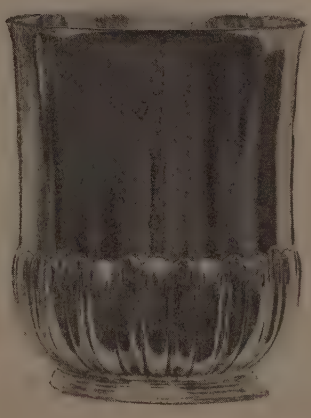


Illustration 42. Vertical Fluting on a Silver Cup.

Considering the fact that as a form of pewter enrichment, *engraving*, by actually removing the metal, weakens its construction, one can realize the care with which the pewterer approached the process. Used as a means of accenting chasing, engraving has its place, as will be shown later on. A form of engraving called *joggled* or *wriggled* work produced a series of small zig-zag cuts, varying with the width of the graver and the pressure or speed of the travel. This form is clearly seen in Illustration 43, a silver cup by Paul Revere. Every one knows of Revere's midnight ride, but few know him as one of our best and earliest silver workers. While this cup is made of silver, its superb contours and correct subordination of enrichment to form make it worth studying. The joggled ornament on the cup is well handled, but the beginner should reserve this for future experimentation.

Illustration 43. Paul Revere Cup With Joggled Ornamentation.
(Courtesy of the Boston Museum of Fine Arts.)

Joggled work is shown in Illustration 44, a britannia creamer which stands for an example of ornate, overdone decoration. As a rule, mouldings in britannia should be kept simple and flat, avoiding sharp edges and projecting angles. When correctly treated, they form one of the most attractive and suitable methods of enrichment. Among other forms of pewter enrichment may be mentioned inlaying with copper, gilding, silvering, lacquering. However, these are of little value because they cover the attractiveness of the metal; it is like covering mahogany with white enamel. Some of these inconsistencies were so marked as to cause the ban of the Pewterer's Guild to rest upon them.

For school practice, *chasing* applied to britannia is one of the most educative of the decorative processes. The art of engraving requires only practice, while its results on britannia hardly justify this amount of application. *Joggling* and *pointelle* (pricked work) require the treatment of experienced designers to save pewter from appearing "spotty."

Illustration 44. Ornate and Overdecorated Britannia. Joggled and Chased Surface Enrichment.
(Courtesy of the Wisconsin Historical Museum, Madison.)

CHASING

Plasticine or clay modeling of low relief ornament should precede work in chasing, thus acquainting the student with the possibilities of the art, and supplying a background of information with which the constructive imagination may function. Use chasing with reserve, relying upon the decorative values of plain, unenriched surfaces. Study the modern side wall bracket or fixture of Illustration 45. Since a project of this character receives little wear, chasing is justified, limited as it is in extent, and balanced by a large undecorated utilitarian reflector.

Before advancing to the design of our project, it is imperative to understand the limitations of the chasing process, which leads us to its tools and technique. Chasing tools are simple, and are easily constructed in the art metal shop by the pupil, thus lending greater educational value to the work and also a saving in money. Certain complex matting tools are beyond the average pupil's capacity, and are only used on advanced problems.

TOOLS AND PROCESSES OF CHASING — ENGRAVING

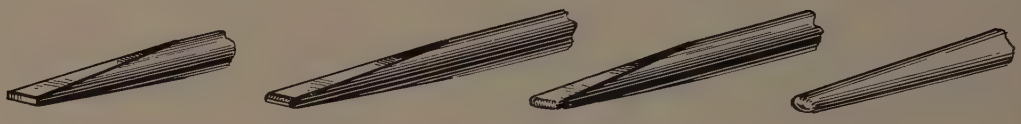


FIG. 1. FIG. 2. FIG. 3. FIG. 4.

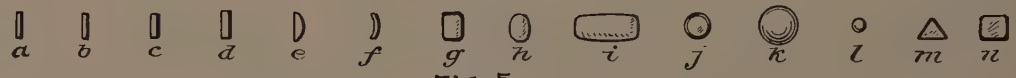
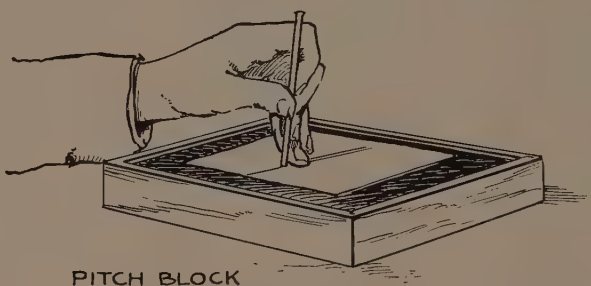


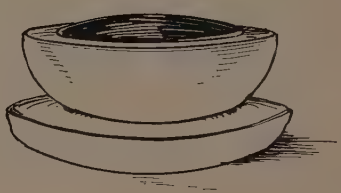
FIG 5

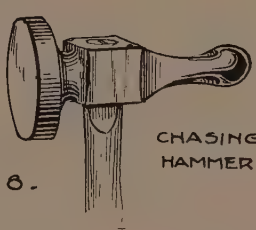
FIG. 6.

FIG. 7.
PITCH BOWL



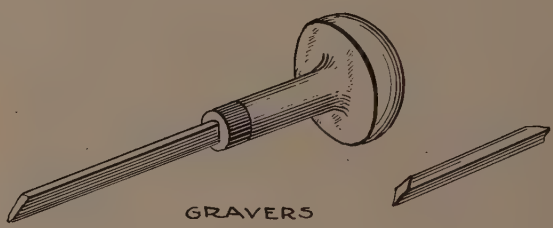
PITCH BLOCK





CHASING HAMMER

FIG 8.



GRAVERS

FIG. 9

FIG. 10.

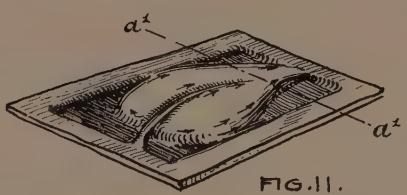


FIG. 11.

FIG. 12.

FIG. 13

STEPS IN CHASING

FIG. 14.

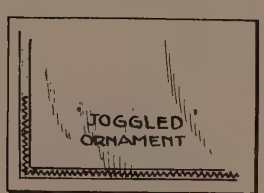


FIG. 15

FIG. 16

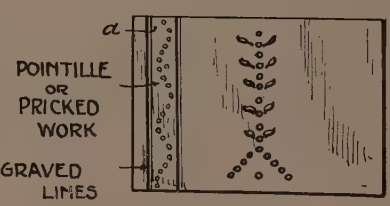


FIG. 17.

W.H.Y

Plate 25. Tools and Processes Used in Chasing and Engraving.

Chasing, as applied to pewter, is a matter of low relief, achieved by three steps: (1) outlining the design; (2) modeling or punching up the more prominent raised portions from the back of the metal; and (3) finishing all surfaces from the front. For this purpose a number of either tool steel or brass tools are used with their working ends, highly polished surfaces of various shapes, acting as punches, to raise or depress the metal.

For most of the tools used to start the work, round stock from one-eighth inch to three-sixteenths inch in diameter, cut four inches long, is suitable. Mr. A. F. Payne divides chasing tools into four groups: "Tracers, straight and curved, that are used to make lines; planishers of numerous shapes and sizes used to beat down the background and for modeling; mats similar in shape to planishers, but with matted or grained surfaces which are transferred to the metal when the tools are used; beads, rosettes, and special tools." The one-eighth inch stock already mentioned is adapted to the major portion of the tools, although stock rectanguler in section and in some cases square (Plate 25, Figure 5), is necessary. For raising or modeling large areas, hard maple, smoothed and polished to the requisite form, acts admirably on britannia without marring its surface.

Figures 1, 2, and 3, Plate 25, show steps leading toward the formation of a tracer or outlining tool. Figure 1 shows the stock squared and tapered; Figure 2, the addition of a slight bevel around the end; and Figure 3 illustrates the tool as fully rounded, all sharp edges removed, with the slightest of curves from left to right, finally to be polished to the highest degree with fine emery cloth, oil and the tripoli buff. If these tools are of steel, temper them to a light straw color, although for pewter this step is not necessary.

Figure 4, Plate 25, is an elliptically shaped tool, slightly flat on its working surface, which acts as a planisher, a stone setter, and a pusher and burnisher for the enameled discs described in Chapter VI. Much work may be accomplished with these tools, and the average time for making them is fifteen minutes each. For outlining curved contours, the curved tracer, Figure 5f, Plate 25, is useful; a, b, c, and d are tracers of various widths; k and l are ball-shaped or doming punches; o is used for beating down backgrounds, while the rest are useful both for modeling from the back of the metal and for planishing.

During the chasing process, pewter is secured to what is known as a pitch block, or pitch pan. Pitch is a compound of burgundy pitch, tallow, and plaster-of-Paris, which may be bought ready mixed from dealers. The sheet of pewter is placed on the pitch block and heated gently with a bun-

sen burner. Using a stick of wood, bring all parts into contact with the pitch compound, testing the contact with light blows; if any part sounds hollow, reheat and remedy the defect. For small work, the pitch bowl of Figure 7, Plate 25, with its leather supporting pad, is useful. It may be purchased from dealers or made readily with the use of the chemist's sand bath bowl and a sand bag. These bowls may be turned in any desired position and thus aid in the manipulation of the work. If the bottom of the metal is oiled before attaching to the pitch, its subsequent release will be aided.

Illustration 45. Chased and Engraved Side Wall Bracket.
(Courtesy of Kantack and Warman, New York City.)

As a substitute for pitch, American modeling wax may be used and it will work readily in cold weather. The wax may be melted and poured into a small baking dish, three or four inches deep; save the wax by filling the bottom of the pan with small pieces of brick.

To transfer the design to the metal, work over the metal surface with fine pumice stone, using a circular or spiral motion, thus raising a slight "tooth" on the metal. Securing the design to the metal by small balls of wax, slip a fresh sheet of carbon paper under the design, and with sharp, hard pencil trace the pattern carefully. Unless the tracing is made accurately, much of the spirit is likely to be lost in the transfer. With a scratch point, mark the carbon lines securely but lightly on the pewter. Many prefer to coat the surface of the pewter with engravers' white or whiting, glue, and water, thus giving a dead white surface upon which to transfer the pattern.

In Plate 25, the proper method of holding the chasing tool is seen to be as follows: The thumb and first two fingers hold the tool, while the

hand supported on the fourth and little fingers acts as a pivot; the tool is tipped slightly back. Figure 8, Plate 25, shows the light chasing hammer for which a two ounce ball-and-pein hammer may be substituted.

Turn the work until the line to be traced points toward the worker, then place the slightly tipped tracer on the line, and strike with a light blow on its upturned end. Without conscious effort upon the part of the worker, the tool should move slightly forward, leaving a smooth, even groove. Repeat the blow, constantly keeping the tool in contact with the work. If for any reason the tracer has to be removed, resume work a short distance back. A correctly formed groove or outline should be true, decisive, and (except under a magnifying glass) free from dents. Corners may be turned by rotating the tracer or by use of the curved tracer. With practice, one may form the outline in one operation, although the beginner should work over the lines several times strengthening and correcting the contours. Figure 12, Plate 25, is of a cross section taken on the line a^1-a^1, Figure 11.

In outlining, the main objective is to define the design on the reverse side of the metal, at the same time depressing the background or field of the design. To prove this, warm the metal slightly and remove from the pitch or wax. After cleaning with kerosene, in which pitch is soluble, or after removing the wax with benzine, inspect the delicately outlined pattern on the back of the metal. Retaining the reverse side of the metal uppermost, return to the pitch block, and proceed to model the design with light blows, "coaxing" rather than forcing the metal into relief, using the largest possible tools which will fit the surface to be raised. Keep these tools constantly in motion and in contact with the work. Figure 13, Plate 25, shows the process, with suggestions as to some of the tools used. Little raising of the background should be attempted, with all of the modeling moving toward a climax and reaching its highest point at the center of interest in the design.

Referring to Plate 26, Figure 2, the reader will find illustrated the reverse of the cover of Figure 1. This is beginner's work in chasing, and some of the errors common to starting are well illustrated. From the back the modeling should be free from dents and tool marks. In Figure 2, tool dents are observed upon some of the leaf forms but, with increased skill in manipulation, these dents disappear, and the smooth, even modeling of the planes is apparent. Judgment in selecting correct tools will simplify this process. For example, the berries are raised by the use of tool L, Figure 5, Plate 25.

FIG. 1. CHASED ENRICHMENT MODELED INTO PERFECT UNITY WITH THE SURFACE

E HANSEN DES

FIG. 3.

FIG. 4. A WORKING DESIGN

FIG. 2. COVER OF FIGURE REVERSED

FIG. 7. A PAUL REVERE SILVER PITCHER WITH ENGRAVED DECORATION COURTESY BOSTON MUSEUM OF FINE ARTS

FIG. 5.

SKETCHES

FIG. 6.

FIG. 8. NOTE 'DETACHED' APPEARANCE OF MECHANICAL PROCESS

Plate 26. Good and Bad Examples of Chasing.

When the back modeling has been completed, remove the plate, clean thoroughly, fill in the highest projections with melted chips of pitch or wax, return to the pitch block, and finish with the planishers. Figure 14, Plate 25, shows some of the tools used at the cross section indicated, while Figure 11 illustrates their direction. The idea is to make the design grow out of the background in modeled planes. Hold and move the tools as in outlining, planishing in steady, even strokes so far as possible, paralleling the contours or at least working in sympathy with them. Figure 11, Plate 25, gives arrow points for planisher paths. With flat tools, beat down the background and soften the edges until no trace of the original outline remains. Tiny bands of planished modeling will give character to the work and texture to the surface. Remember that, as in modeling, chasing must have the appearance of *belonging to the surface from which it springs*, rather than the "stuck on and stamped out" effect so often associated with mechanical stamping and embossing. Figure 8, Plate 26, shows this mechanical effect. When contrasted with Figure 1, it shows the latter to possess many more artistic attributes—the quality of a hand process.

Illustration 46. Desk Pieces With Over-Modeled Chasing, Producing Inartistic and Unsubordinated Results.

Over-high modeling, as in Illustration 46, has no place in pewter decoration. By minimizing rather than accenting the height of back modeling, success in this respect will be more nearly secured. The result is bound to be higher than the beginner anticipates. Background treatment may be made less mechanical by tiny tool marks, as in Figure 3, Plate 26, or Illustration 45, in which the matting tool has played its part. In the latter design, accentuation is supplied by details carved in the leaves with the graver.

ENGRAVING

This brings us to the last suggested process, that of engraving. It should be used with extreme reserve, for, unless cleverly used, it fails to

harmonize with the chasing. Figures 9 and 10, of Plate 25, are gravers supplied with long handles. Gravers are named in catalogs to accord with the shapes of their cutting surfaces, being square, flat, round, pointed, lozenge, diamond, oval, knife, or bevel as the case may be. Vautier gravers No. 56 round, No. 2 bevel, No. 4 square, and No. 5 flat will be sufficient for beginners' use. As most gravers are too long, it is good practice to break off one inch from the end and regrind.

Unless the graver is sharp, it will slip and mar the work. By trying the cutting edge on the nail of the hand its degree of sharpness is ascertained, for it should not slip across the nail. Quoting Hasluck in *Engraving:* "The method of holding the graver is as follows: Take it in the right hand, with the handle on the palm, grasping firmly with the forefinger and thumb. Hold the work with the second, third, and fourth fingers and thumb of the left hand. The first finger should be at liberty to place in front of the thumb of the right hand to prevent the graver from slipping.

"The hand, not the arm, is used to propel the graver, the length of the stroke rarely exceeding an inch. When the length of the cut exceeds the length of the stroke, the thumb is moved forward and replanted firmly on the plate. The graver is drawn back by the muscles of the hand, the point placed in the cut, and another forward stroke is made."

If the hand is raised too high, the graver will "dig in" while the lowered hand will cause the tool to slip out of the metal. A convenient method of terminating a cut is shown in the leaf veinings of Illustration 45, and detailed on Plate 25, Figure 16.

The *joggled line* decoration of Figure 15, Plate 26, seen in the additional example of Figure 7, Plate 26, and Illustration 44, is made by rotating the round graver of Figure 9, Plate 25, with a twisting of the wrist, at the same time applying a slight forward pressure.

Outside of purely utilitarian factors, engraving is better fitted to silver than to the softer britannia. To feel this adequately, study the beautiful, finely engraved Colonial pitcher of Figure 7, Plate 26, in comparison with Figure 1 of the same plate. Chasing is better adapted to the character of pewter, with engraving used merely for supporting pricked work or for bringing out small details and accents.

Pewter chasing is toned or oxidized with a 5 percent Nitric Acid solution. Toning all chased parts and removing the oxidation from the high areas with pumice lends effectiveness to the design.

Chapter XIV

THE LIGHTING UNIT AND ITS DESIGN

BEFORE terminating the study of pewter, it seems worth while to submit a type of problem with aesthetic and constructive correlations of marked educational value for furthering creative effort, while the completed article will make for home economy. The problem, that of making lighting fixtures for the home, demands a knowledge of the principles of modern home lighting, simplified for comprehension of secondary school pupils, constructive laws of wiring, insurance regulations and other city restrictions, and, of course, the necessary art-metal work technic with which to complete the articles.

Of early illumination it can well be said that

"'Twas a light that made
Darkness itself appear
A thing of comfort,"

although it is equally pertinent to many samples of contemporary lighting in which powerful exposed light sources, glaring walls and ceilings, accompanied by black shadows and sharp cast shadows, coupled with poorly placed fixtures, made darkness a distinct relief. In planning houses, few individuals consider the question of lighting, until the time arrives for the purchase of fixtures. The fixture dealer primarily is concerned in selling and, frequently, is not competent to act in an advisory capacity, or to give judgment which guarantees an efficient and harmonious lighting plan. The architect frequently leaves the placing and selection of patterns to the owner, who becomes submerged in his problem. Many architects and fixture dealers are unaware of the unconscious imprint poor lighting will leave upon the health and disposition of the occupants of the house. The chief function is to make the house cheerful and attractive.

The home is comparable with the stage, delineating life's moods and activities. These activities usually reach their climax after daylight has ceased and artificial lighting is called upon to play its part. Thus, it is seen that lighting becomes active in furnishing the proper atmosphere or background to fit many moods and occasions. Upon humans, the psychological and physiological effects of light are established past debate and play their parts in the arts—dancing, the drama, architecture, decoration, and music. In these activities, light furnishes an envelope to supplement action and the

spoken word, occasionally rising to the importance of the leading rôle. If light is such a prominent factor in these arts, it becomes imperative that more attention be paid to *physical* and *emotional* aspects of artificial illumination and their relation to home life—our permanent environment for so many social and family activities. The general indifference to lighting will succumb when the potentialities of correct distribution and coloring are made clear.

Correct residential lighting is controlled by a few simple principles coordinated with that feeling of individuality, which normally is associated with every artistically planned house. In a brief chapter, each room cannot be discussed in detail, but one room may be taken as an example, and from it inferences may be drawn as to the lighting of the other rooms.

LIGHTING THE LIVING ROOM

This room becomes the setting for many functions, ranging from a lively company engaged in cards or conversation, to quiet groups gathered for study or reading. In lighting this or any room, avoid a glare physiologically injurious, as conducive to eye strain and headaches; psychologically an error, as the result is inartistic, garish, and far from restful. A prolific source of glare is the unshaded clear lamp whether in the ceiling, side wall bracket, or in a poorly designed reading lamp, with its exposed bulb producing annoyance to vision, discomfort and ill temper to both guests and members of the household. A centrally placed ceiling fixture for the living room is not free from criticism, as its position suggests symmetrical treatment out of harmony with the usual placing of the furniture, while this source of illumination fills the room with unnecessary brilliance, casting heavy shadows under the furniture and leaving little of that charm of soft light and shade or modelling inherent in good lighting. Eventually living room ceiling sources of light become monotonous and fail to adapt themselves either to the mood of the individual or to the spirit of a group. With the modern tendency toward low ceilings, their direct or indirect brilliant illumination is likely to become tiresome.

The happy solution is in a system of lighting sufficiently flexible to adapt itself to the dual uses of the room. Following the practice of stage lighting, two methods are used: (1) Flood lighting is provided by wall fixtures shaded to prevent glare on the walls and sufficiently low in wattage to eliminate over brilliant spots on the ceiling, although the latter may be dimmed by covering the tops of the shades. The flood method of lighting is adequate for occasions which demand general illumination, while the

color of the lighting scheme (Chapter XV) may be made to fit the spirit of the group. (2) For reading or study, *spot lighting* by portable decorative table and floor lamps is an excellent practice, leaving the remainder of the room partly dark, a factor making for concentration and rest. In Chapter XV will be found other illustrations for spot lighting.

By having both methods in a room, and using either arrangement alone or in combination, marked flexibility is secured, ranging from concentration to general distribution. The plan requires from four to six baseboard outlets for portable lamps, and a number of wall brackets, each controlled by a chain pull switch. On the plea of economy, this outlay may seem excessive, but additional outlets cost little if added at the time the house is built.

Summarizing the present facts, the following rules are given: (1) Avoid glare; (2) adapt the illumination to the use of the room; (3) in general lighting by wall brackets, avoid "spotty" lights and shadows by the careful adjustment and shading of wall brackets. Try for a pleasing tonality. (4) Lighting fixtures should harmonize with the architectural features of the room.

As the usual fixture stock in the small city is limited and expensive, economy may be practiced and individuality of expression achieved by making the fixture of pewter as an art-metal-class project. It is excellent practice for pupils as potential house owners, to utilize architects' house plans by cutting out paper to represent the various pieces of furniture comprising the equipment of a room. With this visual aid in picturing the room, move the pieces around the plan, adjusting them to fit portable lamps and wall fixtures until the arrangement suggests an efficient, cheerful, and artistic whole, thus giving the key to proper locations for baseboard outlets and wall fixtures.

CONSTRUCTIVE WIRING DATA

With this brief introduction to the science and art of living room lighting as a part of the designer-craftsman's background of knowledge, he must add information of electrical appliances directly connected with lighting fixtures. Most city and insurance wiring rules stipulate the use of conduit wiring, or the enclosure of all light wires within metal pipes or conduits, as in *a*, Figures 1 and 2, Illustration 47, thus lessening the fire hazard from short circuits. Upon reaching the location of a wall bracket, the conduit pipes are fastened by lock nuts to outlet boxes, *b-b*, Figures 1 and 2, fastened by screws passing through the screw holes *c-c* to the framework of the house. For hanging lanterns or other fixtures extending some

distance from the wall, an attachment shown clearly in Figure 2, Illustration 47, is used. The wires *d* pass from the conduit *a* through a hollow figure *e* termed a *hickey*, into the extension pipe *f*, and thence to the lantern or other lamp socket. The pipe *f* and the wire *e* are insulated from the conduit box by the nut *g*, made of insulating material. The outlet box and hickey are concealed by a canopy or dome, usually fastened by a set screw to the pipe *f*. This hood, while not illustrated, is readily to be seen on porch lanterns and many interior fixtures.

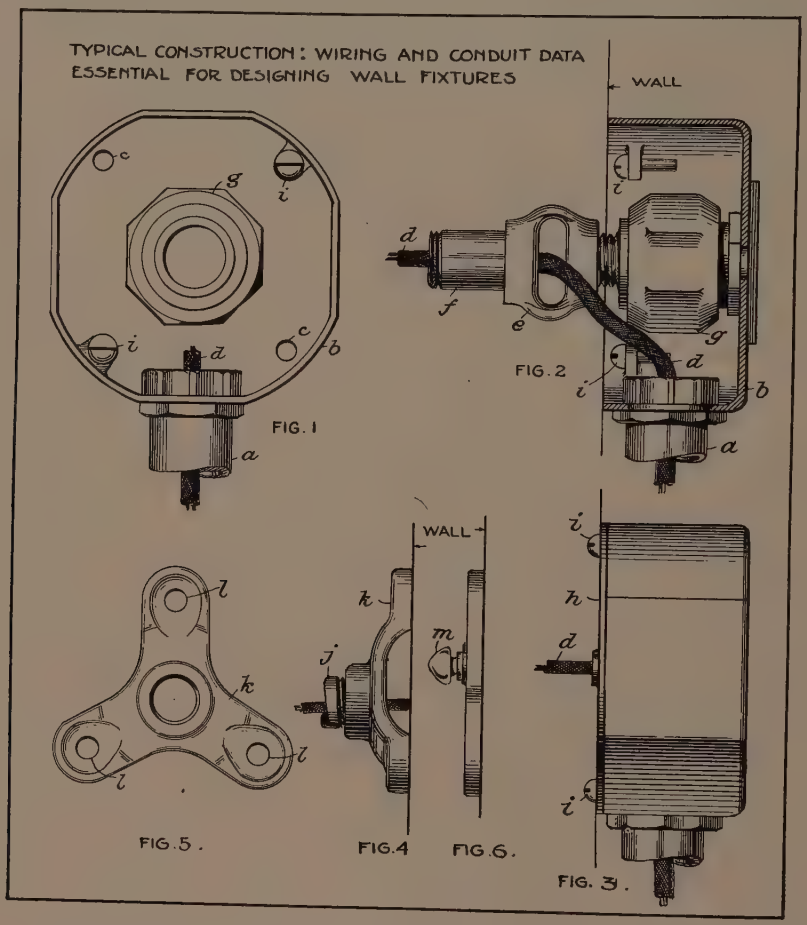


Illustration 47. Wiring and Conduit Data for Wall Fixture.

If a fixture fitting closely to the wall surface is desired, the extension pipe no longer becomes necessary. A cover plate *h*, Figure 3, is fastened to the outlet box by the screws *i-i*, while the wire *d* passes to the fixture socket through the hole in the plate center.

For non-conduit construction leading to extended fixtures, the wires pass directly through the plaster into pipe *j*, Figure 4, Illustration 47, attached to a *crowfoot* casting *k*, which spreads out as in Figure 5, and attaches directly to the plaster of the wall by screws through holes *l-l-l*, Figure 5. Hoods or canopies cover the crowfoot in exactly the same manner as explained for conduit construction. For wall brackets fitting quite closely to the wall, a flat crowfoot, Figure 6, with the wires passing directly to the lamp socket, supplies a method of securing the fixture to the wall. Note the ornamental set screw *m* which presumably passes through a rosette or a similar ornament, and thence into a tapped hole in the crowfoot, securing the entire design firmly to the wall.

There are objections to the use of candles in lighting fixtures, the objectors claiming them to be imitations and shams. Depicted with realistic candle drippings, they are decidedly in poor taste. Conventionalized, with decorative lamps, they are less objectionable and are found in the best commercial fixtures. Illustration 48, Figure 1, shows a vertical cross section through a candle, with the method of insertion into the ornament *a*. A small cylindrical plinth of wood *b* inserted into the bottom of candle *c* is held by small wood screws to the metal box *d*, which in turn fits into the ornamental feature *a*. A porcelain reduction plug *e* allows the candle to be used for smaller lamps.

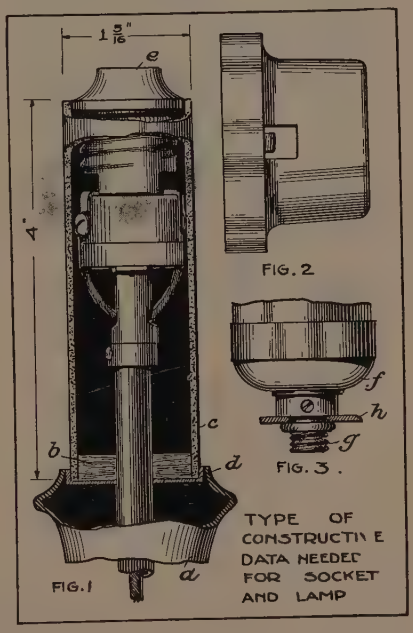


Illustration 48. Construction Data for Lamp Sockets.

Figure 2, Illustration 48, is the usual porcelain lamp socket receptacle, valuable in fixture construction, while Figure 3 shows a method of fastening lamp sockets to lanterns or other flat pieces of metal. In Figure 3, *f* is a portion of the lamp socket, *n* is a cross section of the lantern top or flat plate, while *g* is a commercial nipple which, screwing into socket *f*, holds the lantern *h* firmly to the lamp. Attached to a pipe, this fastening has a wide range of applications. All wiring joints are securely soldered and insulated, and no wire should pass through a piece of metal with sharp edges, or through wood, without being protected by the usual commercial insulator.

COLONIAL LIGHTING FIXTURES

FIGURE
TRANSOM MOTIVE

FIGURE 2. SIDE LIGHT
KEYSTONE AND TRAN
SOM MOTIVES

FIGURE 3. CANDLE SCONCE AND
REVERSED IONIC CURVES AS MOTIVES

FIGURE 4 THE SPIRIT
OF THE COLONIAL

W.H.V. des.

Plate 27. Colonial Wall Brackets.

The preceding illustrations show how any fixture design must be adapted to the electrical work in the house, and indicates the type of data needed to secure safe and workable fixture designs. Dimensions of lamps, sockets, and the simple data are readily obtained from the objects.

THE FIXTURE DESIGNS

While many problems in portable lamps and showers are possible, this chapter is restricted to wall brackets. Let us suppose the house to be Colonial in spirit, with a living room ornamental *en rapport*. The pencil sketch, as of Figure 4, Plate 27, shows the predominance of straight lines or rectilineal motives in Colonial architecture, with its hint of the classic and the delicacy of its details. The front entrance doors, as well as the living rooms doors, of our hypothetical house are planned as adaptations of similar Colonial doors with their fine fan-shaped transoms often seen in old New England houses. Of these, Illustration 49 is an example. The pewter lantern of Figure 1, Plate 27, is based on Colonial lines in harmony with the house contours. The fan-transom motive from the doors is repeated, or echoed, in the upper part of the lantern in the form of pierced enrichment, united to the contours by small chased areas. By using sanded glass of heat-resisting qualities directly behind the pierced areas, the diffused light necessary for general lighting can be secured; while, if more light is needed, the sides may be pierced and treated like the front.

A small knob or finial (a Colonial detail often used to point a spire or gable), is placed on the top surface with a similar one at the base. These are threaded and screwed into angle pieces projecting from the wall surface. Not only do they hold the fixture to the wall, but they also allow for its removal in changing or cleaning lamps. The moulding is made in sections, by beating down sheets of pewter into hard maple forms, grooved to the proper shape. These moulds which are soldered to the body of the fixture, are allowed to run to the wall for added strength. The receptacle of Figure 2, Illustration 48, mounted on a piece of insulating material, may be utilized to hold the lamp of low wattage. While conventionalized, this lantern will echo the appearance of light streaming out through the entrance way of a Colonial dwelling. Made from copper, it would serve as an entrance lantern.

The author believes that Figure 2, Plate 27, is a *novel*, simple, and inexpensive form of fixture adapted to school metal practice. It is designed to fit closely to the wall surface and to appear in close unity with it. The dotted lines of Figure 2 indicate what might be termed an outlet box, with

Illustration 49. Colonial Doorway With Fan Shaped Transom.

Illustration 50. Side Lights of this Colonial Doorway Would Serve as a Motive for Fig. 2, Plate 27.

Illustration 51. Colonial Doorway With Broken Pediment.

circular ends, the conduit and its wires entering directly into the lower extremity. Small nickeled screws in the top and bottom keystone projections attach the ornamental plate either to the wall, or to lugs on the outlet box. Sanded or art glass back of the plate diffuse the light and mask the interior. Pewter of at least one-eighth or three-sixteenths inch thickness is necessary to give a sense of solidity and permanence. The Colonial doorway again has been taken as a motive, adapting not only the transom lights but the side panels as well, reminiscent of Illustration 50, together forming an architectonic motive in harmonious relationship to the house.

Figure 3, Plate 27, is a lighting fixture based on the Colonial candlestick, with the front projection forming a shield, cutting off the direct glare from the lamp. With interest primarily centered in the contours, the broken pediment, Illustrations 51 and 52, composed of two opposed volutes, becomes the controlling motive. With the interest confined to the contours,

Illustration 52. Corbin Colonial Hardware. Note Design Correlation With Lighting Fixture in Fig. 3, Plate 27.

little surface enrichment is to be attempted. Thus a small amount of chasing raising the reflector, balanced by two small chased Colonial motives, is ample. The pattern above the reflector is an adaptation of the well known pineapple design, with imbricated leaves simplified from the original in Figure 4, Plate 27. A small turned finial completes the curve of the base. The entire fixture may be attached to the wall by concealed screws, although there are no objections to their visible use, provided they are tinted and finished to harmonize with pewter, and located at decorative points in the structure. As they are used in fine hardware, what valid protest can be directed against their frank use in fixture construction? However, it is better to conceal them and leave an unbroken surface, provided such treatment is possible.

The preceding problems illustrate the possibilities for original and more harmonious lighting fixtures, the development of the creative imagination, and the establishment of relations to coordinated occupations, making an ideal art metal problem.

Chapter XV

THE LIGHTING UNIT AND COLORED LIGHT IN THE HOME

IN planning lighting fixtures, as explained in Chapter XIV, it is unnecessary to keep the mind in one rut and follow the traditional lighting fixtures of quantity production. On the other hand, home limitations or tastes may require fixtures nearer to commercial patterns.

Illustration 53. Dutch Pewter Wall Fixture for Flood Lighting.
(Courtesy of Kantack, Heath and Warman, New York City.)

In quantity production, historic ornament gives the key motive for a large number of designs, as in Illustration 53, varying from the Classic to Early English, Dutch, Colonial or Georgian, and the Arts-and-Crafts. As an example of adaptation, a large room heavily panelled with wood, built with strong vertical and horizontal members, with heavy mediaeval ornament, needs hammered wrought metal fixtures, either in copper or iron,

WALL FIXTURES
COLONIAL MOTIVES

FIGURE 1 THE TRANSOM MOTIVE

FIGURE 2

FIGURE 3 MOTIVES FROM ARCHITECTURAL DETAILS

FIGURE 4. DOUBLE TRANSOM

W.H.V drs

Plate 28. Colonial Flood Light Fixtures.

with their tempos and contours in sympathy with the structural lines of the room, factors guiding one to select a period similar to the Early English for source material. For smaller rooms with Colonial motives, the designer should use simple, classic lines of the Greek, or the Georgian, or one of its derivatives. For fixtures of this type, pewter is in every way harmonious and effective.

The commercial designer begins his work by developing rough sketches drawn either in elevation or in perspective. By a process of elimination, he selects a satisfactory sketch which is worked over, refined in tempo and contours, translated into a scale of elevation or perspective which, attractively colored and rendered, becomes the vehicle for the salesman on the road. The colored sketch makes a strong visual appeal to both dealers and customers, becoming an able substitute for the fixture. Draftsmen prepare a full size working drawing for the factory. For elaborate candelabra, blue prints from these working drawings often occur, to the length of seven or eight feet.

For classwork, the designs of Plate 28 approach commercial construction, but are in no sense copies of commercial designs, as each maintains its own individuality. As shown in Chapter XIV, the motives are from Colonial or Georgian sources and are designed for houses similar in spirit, thus harmonizing lighting fixtures with the exterior, interior, and ornamentation of the dwelling. This is regarded as essential to good taste in modern fixture design.

Referring to Plate 28, it is seen that Colonial doorways, mantle details, hardware, and other architectural features similar to Illustrations 54, 55, and 56, suggested the tempo and contours of the designs. The long and simple chased panels of Figure 1, Plate 28, are reminiscent of door or fireplace panels, while the top fan-shaped ornament resembles the transom glass over a doorway. The small turned finial and contours of the socket enclosure were derived from classic mouldings.

Construction of Figure 1, Plate 28, normally would begin with the back or wall plate, chased as described in Chapter XIV. To give a suggestion of thickness and at the same time allow space for the necessary wires, solder a rim of pewter to the back plates, thus softening its sharp front corners. The elbow leading to the lamp is a hollow square tube, readily made by bending a sheet of 18 gauge britannia. By cutting a deep V-shaped groove with the graver on each bending line, and folding the opposed surfaces towards the groove, a much sharper corner is formed. The graver removes the surplus metal which has a tendency to make the corner round and

Illustration 54. Fan Transom in Colonial Doorway.

Illustration 55. Possible Motive for Fixture.

Illustration 56. Colonial Doorway With Engaged Columns.

not in accord with the demands of the design. The vertical square shaft is made in a similar manner, with its depressed panels either carved or chased. Some craftsmen prefer to make square tubes from two right-angled pieces, with 45-degree soldered corners uniting the two sections. The lower part of the socket covering or "husk" may be made from a circular blank, beaten down into a depression, turned in a maple block, or preferably, by shaping up a cylinder, drawing in the base and expanding the top. Four small nickeled screws hold the fixture to the wall. A small silk shade is an important element for eliminating glare and adding color discussed later in this chapter.

Illustration 57. Pewter Candelabra for Spot Lighting of Dining Room Table.
(Courtesy of Kantack, Heath and Warman, New York City.)

Figure 2, Plate 28, is quite similar in construction, with a hollow connection link and wire duct between base plate and socket, leaving the wall with a tangential movement. It is better design for the bracket to leave the base plate either with a frank right-angle contrast or by a tangent with its resulting continuity. The pineapple frosted miniature lamp is re-echoed in the carved and turned pineapple finial. Interest is given to the surface by varying its texture, that is, by showing slight tooling of the background, contrasting with the smooth surfaces of the higher areas. Tooling should

be present only when it represents a perfectly normal product of the chasing process, in other words, a natural result of a necessary tool process.

If a downward concentration of illumination is desirable, use a design like Figure 3, Plate 28. A Colonial tankard handle supplies the sweep of the link, while the beautiful curves of a New England pulpit sounding-board suggested the shade top. A simple line motive enriches the pewter shade, developed either by engraving, by pointelle work, or by

Illustration 58. A Brass and Pewter Lighting Fixture Showing William and Mary Influence.
(Courtesy of Kantack, Heath and Warman, New York City.)

joggling, and justified by the fact that the shade is subjected to little frictional wear. The back plate is beaten down from the back to form its curved enrichment and afterward slightly planished, which should be done before sawing the exact and final shape of the contours.

Figure 4, Plate 28, again shows an adaptation of the transom motive with a small classic urn in chased relief. Shaped over a round rod, the wire conduit, or tube, can be formed by methods indicated in conical spout

construction. To bend the tube, fill it with a pitch compound, shape over a large mandrel, and planish if desired. To free the tube from pitch or wax, warm slightly, using care to avoid a serious explosion by applying the heat at the end of the tube rather than at the center. Illustrations 57 and 58 are typical spot lighting devices for the dining room.

As a form of surface enrichment, chasing, carving, and tooling on small objects, like residence lighting fixtures, must be inconspicuous and in what is known as low relief, proportionately as low as modeling on coins. Do not let chasing be the "whole show," but subordinate it to the object as a whole, letting proportions and contours have some claim for emphasis and beauty.

In these chapters, various illustrations have pointed the way toward originality of thought and the establishment of a proper background for such attainments. Educationally, no greater injury can be inflicted upon the pupil than thinly disguised plagiarism—copying designs of others, a practice which automatically eliminates all possibility of initiative and creative effort, and basic values of craft work in general. This is true of problems with art content or of purely utilitarian origin, from jewelry to electric wiring. The aims of a course may be contact and intimacy with material. But how much interest is to be expected in materials unless the pupil learns to make them serve as expression of his own ideas? Tool technique has its place, but as means towards an objective of creative effort. Let us hope that the teacher whose educational badge of authority has emblazoned upon it as testing devices the straight edge, the try square, the caliper, and the micrometer gauge, may learn to surround them with a laurel wreath symbolic of individual initiative and original achievement.

COLORED LIGHTING

The field of original attainment is particularly pertinent to residence lighting in which the magnitude of the potentiality of colored light is changing the general conception of artificial light from a common utility to a fine art. Many people are indifferent to color or have a lack of consciousness or appreciation of its effects. If color is sufficiently used and thus brought to our consciousness, a clearing of mental color blindness would reveal the charm of the color world and the consequent reduction in the monotony of our environment.

Color affects us in many ways, but for this chapter it is well to isolate and consider only two phases, the psychological and the physiological aspects. Physiologically speaking, if we are brought into an atmosphere of

certain colored lights, our nerves are stimulated and heart beats quickened, while the resultant increased circulation produces an increased physical sense of pleasure and wellbeing. This type of stimulus has practically no aesthetic significance, although it is a factor in considering colored lighting. Again, colored lights can make us cheerful, contented, depressed, or in a state of mind for mental concentration, indicating an emotional reaction to color or the psychological aspect of highest aesthetic importance. Suppose a color makes us feel warm or cool: This stimulus stands between the mental and the physical excitants and possibly might be called the psycho-physiological aspect, possessing low value in aesthetic appreciation tests.

In recent tests[1] twelve colors were classified as to their psychological influence on different people, with the definiteness of each influence shown by the magnitude of the figure for each color.

	Exciting Influence	Tranquillizing Influence	Subduing Influence
Crimson	41	0	10
Scarlet	56	0	0
Deep Orange	59	0	0
Orange Yellow	55	6	0
Yellow	53	6	0
Yellow Green	14	39	5
Green	28	32	0
Blue Green	32	23	6
Blue	11	21	30
Violet Blue	0	17	45
Violet	0	6	54
Purple	3	1	48

The positively exciting colors are from crimson to yellow with the subduing hues from blue to purple, while the neutral or tranquil colors range from yellow green to violet blue. Grouped with reference to both physiological and psychological aspects, we have the following analysis:

Red, very exciting, irritating, bloody, passionate.
Orange, hot warm, glowing, lively, suffocating.
Yellow, gay, extreme opposite of sickly.

[1]Luckiesh, Lighting the Home.

Green, peaceful, neutral, tranquil.
Blue, cool, sedate, sober.
Violet, stern, hard, unyielding, gloomy.
Purple, stately, pompous, impressive.

While these tables show some inconsistencies, it must be understood that the question of color appreciation is complex, but one in which people agree as to the general truths of color reactions. Let the reader analyze his own moods when the bright sunlight relieves days of gloom and shadow, the effects of moonlight or his feeling of rest upon entering a big public library reading room with its green shaded lights.

So with the data at hand, there is a keyboard of color reactions either to accentuate, neutralize, or balance the various moods of home, social, study, and play life. Mixing colors by methods shortly to be explained will not only give more subtlety but, with a neutralizer, it is possible to tone down an irritating color to accord not only with the existing color scheme of a room, but to more nearly match the mood of the occasion. Often two circuits are used for the two main uses of rooms, as explained in Chapter XIV. Rheostats or dimmers can be utilized to give greater or less illumination, affording flexibility and an avoidance of monotony.

How can the colored lamps be obtained? These are just appearing in the market with but a limited assortment at the present writing. Lamp dealers have varnishes and cellulose lacquers colored with dyes, but these are likely to fade under the action of heat and light. They are, however, readily recolored.

For secondary school pupils, the following method of coloring is simple and interesting, offering full correlation with other art projects. In a small sheet of wall board or thin board, bore a number of holes into which the lamps may be screwed temporarily. Prepare a thick, hot solution of gelatin and after having screwed the lamps into the wall board, immerse them in the solution of gelatin and suspend them tip downward to dry. A baking powder tin makes an excellent receptacle for holding gelatin.

For coloring, use a dye formed from lantern-slide colors, Velox photographic coloring dyes, or any commercial water-soluble dyes. For coloring the lamps, detach from the board, hold in a horizontal position and, with a large flat water color brush, float a wash of color over each lamp. Do this by floating a band of color across the lamp from tip to base, rotating the lamp on its long axis. Continue the wall of color around the lamp until the bulb is covered. Repeat this process until the desired color is ob-

tained. For intense blues, violets, and reds, it is best to use the commercial lacquers. If there is sufficient dye, direct dipping will give the best results. Dry the lamps carefully. They are now ready for use and fairly permanent.

For lanterns, flat plates may be colored in exactly the same way, allowing, of course, for differences in planes. Sheets of colored gelatin are to be secured from stage electricians or from stage-lighting supply houses. Sheet gelatin wrapped into cylindrical form, between layers of wire gauze, forms a good filter for concealed lamps. Placed between sheets of sanded glass, they diffuse light attractively for lanterns and mask the lamp mechanism. Checker board tinting of sheets of clear glass, placed under sanded glass, gives interesting tints of color. The recent popularity of parchment is too well known to need comment.

Silk shades make some of the most successful color filters, giving delicacy, subtlety, and diffusion. By using several layers on the sides and a single layer across the top, varied diffusion is securely coupled with a practically uncolored downward light, usually a desirable factor. A white interior, or lining, will give uncolored downward illumination, while colored linings reflect a faint mellowed echo of themselves. By using contrasting colors in shade construction, an exciting deep orange lining with a subduing blue exterior for example, will produce a restful mixture of interesting quality.

In using colored lights, one must guard against theatrical effects. The light for common and daily use should be subtly tinted so that its effect is that of an atmosphere rather than a distinct color. That is, upon entering a room, one should not exclaim at the redness or blueness of the color, but be subconsciously affected by the subtle glow. Using color tints or mixing analogous colors — or as suggested for silk shades — filtering light through layer of colors contrasting in influence, but with the desired one slightly stronger than the other, is conducive to the creation of the proper atmosphere. It is well to have an accent of brilliant color as a note of variety. Portable lamp shades frequently supply this note.

As light is the most powerful stimulant for creating moods, it is easy to see that for a living room, subtle oranges, yellows, and hints of red insure, or at least promote, a sense of happiness conducive to best social intercourse; while blue-greens and blues are excellent for general lighting of the study with its aim toward quiet concentration or writing. Portable lamps for the latter room with like or analogous shades, and uncolored

downward light, give illumination for work and accent to the room, while similar but possibly more ornamental lamps, with orange or analogous shades and tinted linings, accord with the lighter living-room activities of magazine or newspaper readings, conversation, play, and the varied occupations of family and social life. Wall brackets and portable lamps make the foregoing possible, and by using them together or separately much variety is obtained. Cove lighting, illuminated window-boxes, ceiling domes, and special picture illumination point the way to many more interesting and beautiful possibilities of painting by light.

For the concealed, or flush wall fixtures of Chapter XIV, art or sanded glass, alone or with a colored filter, will give attractive illumination. Applications of the preceding principles to pewter fixtures will lead to instructive and educational interest in color which in no instance should degenerate into bizarre or Christmas-tree effects. The principles of unity governing pigmentary color harmonies, equally are applicable to lighting, which necessarily must be planned in sympathy with the daytime scheme of the room. So tone and finish a pewter fixture that it will lose all appearance of "newness" and blend in sympathy with the remainder of the room scheme, and with the architectonic motive of the residence. Pewter may be toned by 5 percent Nitric Acid and 95 percent water. A pewter metal fixture, with its mood lighting, produces a true art metal problem with a rich field of correlated subjects briefly introduced in this chapter.

Chapter XVI

THE TOUCH

MUCH has been written of the high standards of design, materials, and workmanship advocated and enforced by the ancient Guild of the Pewterers of England. To ensure quality of materials and workmanship, to trace and punish evaders, various forms of legislation were enacted both by and for this wealthy and respected association. Possibly the most interesting to the craftsman is the "touch" or mark of identification, attached to each legitimately manufactured piece of ware; that is, ware made under the auspices of one of the numerous continental guilds.

Early marks or touches impressed with a die or punch on pewter vessels, usually included either the name or initials of the workman, or some emblem with or without the name or initials. Previous to 1503 the touch was voluntary, the matter resting with the worker; after that date, however, the signature became obligatory through compulsory legislation which lasted for three centuries. This legislation became really effective, and violators had their touches confiscated and were obliged to register a new touch to which was appended a knot or a double f. This penalty was so severe that usually the pewterer had to close his shop and begin again as a journeyman. Moreover, confiscated ware of a cheap alloy was marked with a broad arrow and usually destroyed. Needless to say, collectors of today pay well for arrow-marked ware which has escaped the melting pot. At this, old pewterers must rest uneasy in their graves.

In the Hall of the Pewterer's Company in London, reposed large plates of soft metal, called the Touch Plates, upon which were registered the makers' touches. While some of these plates have been lost, many remain as records of a long line of departed craftsmen. There are records of these plates from 1500 with the last mark registered in 1824.

If these records had been properly maintained and preserved, there would be a complete account of the past craft and its workmen. Unfortunately there are many dateless initials and nameless emblems. The slipshod methods of striking the touch on any part of the plates which happened to be left unoccupied, and the lost records of identification of touches, are evidences of an excellent theory which left much to be desired in clarity. Authorities state that out of 1200 existing marks, only 41 give name and date.

This was due partly to the feeling upon the part of the pewterers that, while the ware should have marks to identify it with the worker, it was unnecessary to add data to the touch in any way approaching advertising. In other words, a man's ware, its appearance, and the quality of material should speak for itself with the purchasers. Little did the pewterer realize the interest future generations would take in the exact date of manufacture, the location of the shop, and other information about the worker. So loath were they to approach anything smacking of self-puffing that even the use of the name of the city in which the ware was made, became illegal.

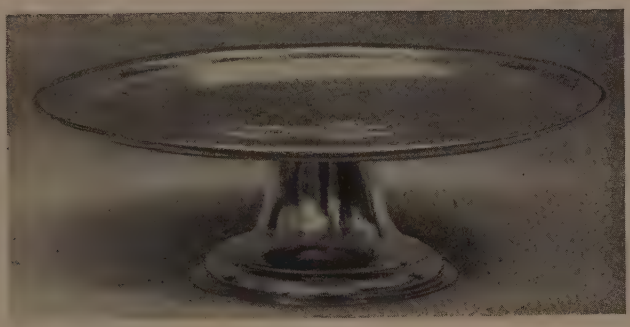


Illustration 59. American Silver Salver—A Fitting Accompaniment for Colonial Fixtures.
(Courtesy of the Boston Museum of Fine Arts.)

With the decline of the power of the Pewterer's Company, touches with initials were replaced by those bearing the names in full, until by the end of the Eighteenth Century very little initialing was used. Apparently added to each piece was a quality mark or possibly merely the stamp of the Company, as represented in Illustration 24, page 65, and Illustration 60. The crowned rose, presumably the Company's emblem, guaranteed the quality of the wares in England, but there is evidence pointing to a tendency to avoid compulsory quality marks, in the belief that the Company's mark automatically guaranteed the quality of the ware as made under the supervision of the pewterers.

Early American pewterers followed closely English customs, and the touches show evidences of good die cutting, good lettering, and dignified and simples devices.

While the pewterer was allowed to mark wares in his own shop, gold and silver smiths were compelled to visit the Company's Hall, where their ware was officially assayed and stamped under much closer supervision. This gives us the origin of the term "Hall Marked Silver." As a study of

a carefully developed system, much can be learned from the markings of English silver and gold, freely copied by the pewterers regardless of vigorous protests from the goldsmiths' and silversmiths' guilds.

Fine silver is 1000 percent pure, while Sterling alloy in this country is 925 percent pure, the remainder being composed of alloy. Thus, in both England and America the term "Sterling" is associated with standard alloys. This term is supposed to have been derived from the fact that the Germans were invited to England by King John for the purpose of reducing silver to the proper fineness or Sterling alloy. As the Germans were termed "Easterlings" or men who came from the East Country, it is easily understood how the term Sterling became a corruption of Easterlingers or the first converters and makers of Sterling alloy.

As early as 1363, there was enacted by the English Parliament a law requiring all silver and gold plate to be marked with the maker's touch, which frequently duplicated his shop sign. This was termed "the mark of the maker." There was a great variety of devices, such as anchors, geese, acorns, initials, bells, and so on, as shown in Plate 29. These are all forerunners of the modern trade mark. With different modifications, one of the four marks on English silver plate must be the initials of the maker's Christian and surname. The second mark must be the Hall Mark of the office or town at which the ware is assayed. From 1478 to 1697 this London assay was represented by the leopard's head crowned. From 1697 to 1719 a figure of Britannia became substituted for the leopard, but from 1822 to the present date the uncrowned leopard's head marks

Illustration 60. The Crowned Rose Touch of the Pewterers' Company, Maker's Name, and Four Marks on Old British Plate.
(Courtesy Wisconsin Historical Museum.)

the London seal. The third mark is the government assay stamp of the lion passant; a tax symbol as well as a guarantee of purity of the alloy. This mark is clearly represented in Illustration 60. The two marks on the left are unknown.

The fourth mark is a seal of heraldic form which varies from time to time in shape, as will be noted on Plate 29, Figure 4. Within this shield is the date letter. For a given period a certain style of lettering was selected and the letters J, V, W, X, Y, and Z were omitted. This leaves 20 letters, one of each year of a twenty year interval. For example, on Plate 29, Figure 4, we find the capital D in Lombardic caps designates 1601 and so on. Roman lower case letters mark a period of 20 years, beginning in 1896. The comprehensive system of marking —the maker's initials, the leopard's head, the lion, and the date letter and shield— represents a complete system of identification for London gold and silver. The smaller assay towns had a less elaborate system of stamps, but even these give a fair method of identification and quality.

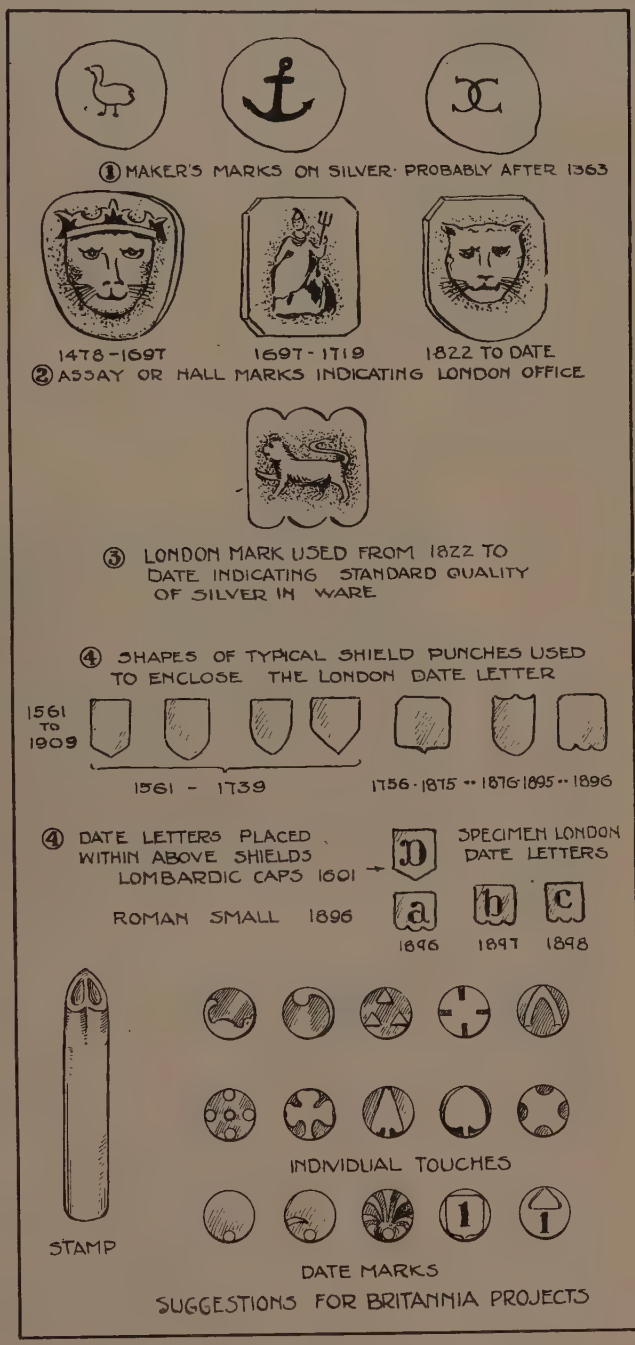

① MAKER'S MARKS ON SILVER PROBABLY AFTER 1363
1478-1697
1697-1719
1822 TO DATE
② ASSAY OR HALL MARKS INDICATING LONDON OFFICE
③ LONDON MARK USED FROM 1822 TO DATE INDICATING STANDARD QUALITY OF SILVER IN WARE
④ SHAPES OF TYPICAL SHIELD PUNCHES USED TO ENCLOSE THE LONDON DATE LETTER
1561 TO 1909
1561 - 1739
1756-1875 -- 1876-1895 -- 1896
④ DATE LETTERS PLACED WITHIN ABOVE SHIELDS
LOMBARDIC CAPS 1601
ROMAN SMALL 1896
SPECIMEN LONDON DATE LETTERS
1896
1897
1898
STAMP
INDIVIDUAL TOUCHES
DATE MARKS
SUGGESTIONS FOR BRITANNIA PROJECTS

Plate 29. Early Makers' Silver Markings.

During the Colonial period in the United States, no general laws were established for marking silver or pewter, but the standard of honesty among the craftsmen was so high that the maker's name stamped on a piece was the sole guarantee of integrity. The Seventeenth Century Colonial silverworker's mark frequently was composed of his initials and an emblem within a shield, or occasionally a heart or trefoil.

Maryland was the first state to enact a law designating the quality of silver by its stamp coupled with an obligatory assay, but other states followed. At present, the responsibility rests with the manufacturer who stamps his ware Sterling or S, or the fraction $\frac{925}{1000}$. Makers frequently add various touches, four being a common number. The eagle, an old time pewter symbol, was a popular stamp, while an emblem designates the pattern. In silver marking the fleur-de-lis thus stands for the Lafayette pattern. The Gorham Company has as its registered trade mark the lion, an anchor, and the letter G.

Illustration 61. Modern Pewter Ware.
(Courtesy of L. H. Vaughan.)

In school practice, the designing and marking of projects by touches is to be encouraged. The custom develops a sense of individual responsibility, pride in the quality of the production, and has the psychological value of signing an important document. Touch designing is excellent classroom practice. Only a few simple touches are illustrated on Plate 29, but these may be made to fit certain characteristics or activities of the individual. Symbolic date marks are possible and desirable. A circle may stand for a certain year, and abstract and harmonious forms may be added for each succeeding year, thus maintaining a class spirit. The teacher could have his quality mark, while the parallel to the English system for school

application would be complete with the introduction of the stamp designating the governing body or school board. Thus, we would have the maker's touch, the date, the teacher's mark, and the school board's approval mark. Brass or steel rods may be shaped quickly by riffle files and engraving tools into the desired punches. A jeweler's eye glass with loup will aid in the formation of small details.

This closes the study of pewter and its projects with suggestions for the old-time signature appended to historic metal. It is hoped that designs will be executed with the same pride and care for the quality and the beauty of the ancient ware.

"Also, as to those of the trade who shall be found working otherwise than is before (set forth), and upon assay shall be found guilty; upon the first default let them lose the material so wrought; upon the second default, let them lose the material and suffer punishment . . . and if the third time they shall be found offending, let them forswear the craft evermore."—From Ordinances of the Pewterers, A. D. 1348.

Chased and Turned Pewter Enrichment.

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